

Amphibian and Reptile Monitoring/Survey of the Kootenai National Forest: 1995

A Report to:

USDA Forest Service

Kootenai National Forest
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Submitted by

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ABSTRACT

Field work in 1995 concentrated on five objectives: 1) establishing a long term monitoring program within the Forest; 2) re-surveying all known Western Toad breeding sites; 3) surveying high altitude wetlands as time permitted; 4) attempting to establish the presence of species for which there are no reliable records; and 5) updating all species distribution maps within the Forest.

A procedure called the Suitable Shoreline Habitat Method (SSHM) was developed for long term monitoring. The method was implemented at 2-4 sites per district; Long-toed Salamanders were monitored at 16 sites, Spotted Frogs at 14 sites, Pacific Chorus Frogs at 11 sites and Western Toads at 4 sites. Total egg production for the Spotted Frog ranged from 3,589-98,525 eggs per site with an average of 841 eggs/mass. The average number of eggs per mass for the Long-toed Salamander was 24 and for the Pacific Chorus Frog 45.

Western Toads were seen at 16 sites and found breeding at 11 sites during 1995. Based on similar data in 1993-94 and current data from other parts of Montana, it is recommended that the Western Toad be listed as a Sensitive species.

Surveys of 10 ponds/lakes over 5,000 feet elevation showed the presence of 3 amphibians (Long-toed Salamander, Spotted Frog and Western Toad) and 1 reptile (Western Terrestrial Garter Snake). No reproduction was observed in the Western Toad. Neoteny (delay of metamorphosis) may be occurring in Long-toed Salamander populations at some high altitude lakes.

The discovery of a Northern Leopard Frog population south of Eureka represents the only known population in the Kootenai National Forest and only the second surviving population west of the continental divide in Montana. The population size was estimated at 10-15 adults with limited reproductive success this past summer. Due to its precarious situation, it is recommended that the Northern Leopard Frog be listed as a Sensitive species and special precautions taken to ensure its survival.

Distribution maps for each species in the KNF were updated based on all known historical records and current surveys. The presence of the Tiger Salamander was confirmed in the Eureka area.

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Museum records were received from: American Museum of Natural History, Academy of Natural Science, Bingham Young University, California Academy of Science, Carnegie Museum, University of Puget Sound Museum, Field Museum of Natural History, Glacier National Park Museum, Illinois Natural History Survey, University of Kansas, Los Angeles County Museum, Louisiana State University Museum of Zoology, Museum of Comparative Zoology - Harvard, Milwaukee Public Museum, Montana State University Museum, Michigan State University Museum, North Carolina State Museum of Natural History, Northern Louisiana University Museum, University of Colorado Museum, University of Georgia Museum of Natural History, University of Idaho Museum, University of Michigan Museum University of South Dakota, United States National Museum of Natural History, University of Texas - Arlington, University of Texas - El Paso, Peabody Museum - Yale, University of California Museum of Vertebrate Zoology, and Mid-continental Ecological Sciences Center at University of New Mexico Museum of Southwestern Biology.

INTRODUCTION

The general distribution of amphibians and reptiles in the Kootenai National Forest (KNF) of Montana was established through survey work in 1993-94 (Werner and Reichel, 1994). Working from this baseline data, efforts in 1995 concentrated on five objectives: 1) establishing a long-term monitoring program within the Forest; 2) re-surveying all known Western Toad (*Bufo boreas*) breeding sites; 3) surveying high altitude lakes/ponds as time permitted; 4) attempting to establish the presence of species for which there are no reliable records; and 5) updating species distribution maps based on 1995 monitoring/surveys and additional historical records. Since each of these objectives are somewhat independent of each other, the final report is divided accordingly.

The updated distribution maps (Objective 5) are illustrated in Appendix H and are based on information in Appendices 1-3 of Werner and Reichel (1994) and Appendices G and I of this report. Identification and illustration of adult amphibians and reptiles in the KNF, as well as their distribution throughout Montana, can be found in Reichel and Flath (1995).

Part I - Long Term Monitoring

Introduction:

Concern over diminishing amphibian populations has prompt interest in developing survey/monitoring programs throughout the country (Heyer *et al.* 1994). In assessing both short and long term changes to amphibian populations, density data is usually more meaningful than relative abundance due in part to the ambiguities by which relative abundance is determined. Since time, cost and personnel often preclude density methods, i.e. mark-recapture, quadrat etc., we developed a simplified method which reduces some of the time-cost-personnel problems. The method is referred to as the Suitable Shoreline Habitat Method (SSHM) and is described in Appendix B.

Methods:

Preliminary surveys of 4-6 wetlands per district were made beginning in late March, 1995. The surveys focused on identifying egg masses, breeding populations, and pond suitability. These surveys and information from the 1993-94 report provided a list of 23 potential monitoring sites (Table 1). The 23 sites were reduced to 16 sites (Figure 1) based on satisfaction of the four conditions listed below: 1) ready access by vehicle; 2) presence of at least two amphibian species; 3) suitable shoreline habitat; 4) representation of different elevations and areas within the district. A final factor in selecting sites was the amount of time and personnel available for surveys in each

Table 1. Preliminary surveys of potential monitoring sites in the Kootenai National Forest, 1995.

District	Site*	Date	Species**	Adults Detected	Egg Masses	Tadpoles seen	Monitoring Potential	Monitored
Cabinet	Big Beaver Creek	06/29	A. m. R. p.			10-100 10-100	Need subdivide	Yes
	Big Eddy Rec. Area	04/02	P. r. R. p.	>30	21 10-100		Thick cattails	No
	Bull River Oxbow	04/03	P. r. R. p.	>50	2		Good	Yes
	Willow Creek	06/29	A. m. R. p.			10-100 10-100	Good	Yes
Fortine	Louis Lake	07/05	A. m. R. p.			10-100 10-100	Need subdivide	Yes
	Louis Lake Pond	05/10	A. m.	1	3		Only 1 species	No
	Lost Lake Marsh	04/29	A. m. R. pi.		1		Good	Yes
	L. Sunday Lk. Pond Powerline Pond	04/30 04/30	R. p. A. m. R. p.	1	5-10 6		Only 1 species Good	No Yes
Libby	Blue Creek Marsh	07/05	A. m. P. r. R. p. B. b.			10-100 1-10 10-100 10-100	Need subdivide	Yes
	Blue Crk Rd. Pond	04/27	A. m. R. p.		25-50 2		Need subdivide	No
	LaFoe Lake	07/06	A. m. R. p. B. b.			10-100 10-100 10-100	Good	Yes
	McKillopp Rd. Pond	04/10	A. m. P. r.	>20	>25		Need subdivide	Yes
	Silver Butte F. Riv.	04/10	P. r.	1			Need subdivide	Yes

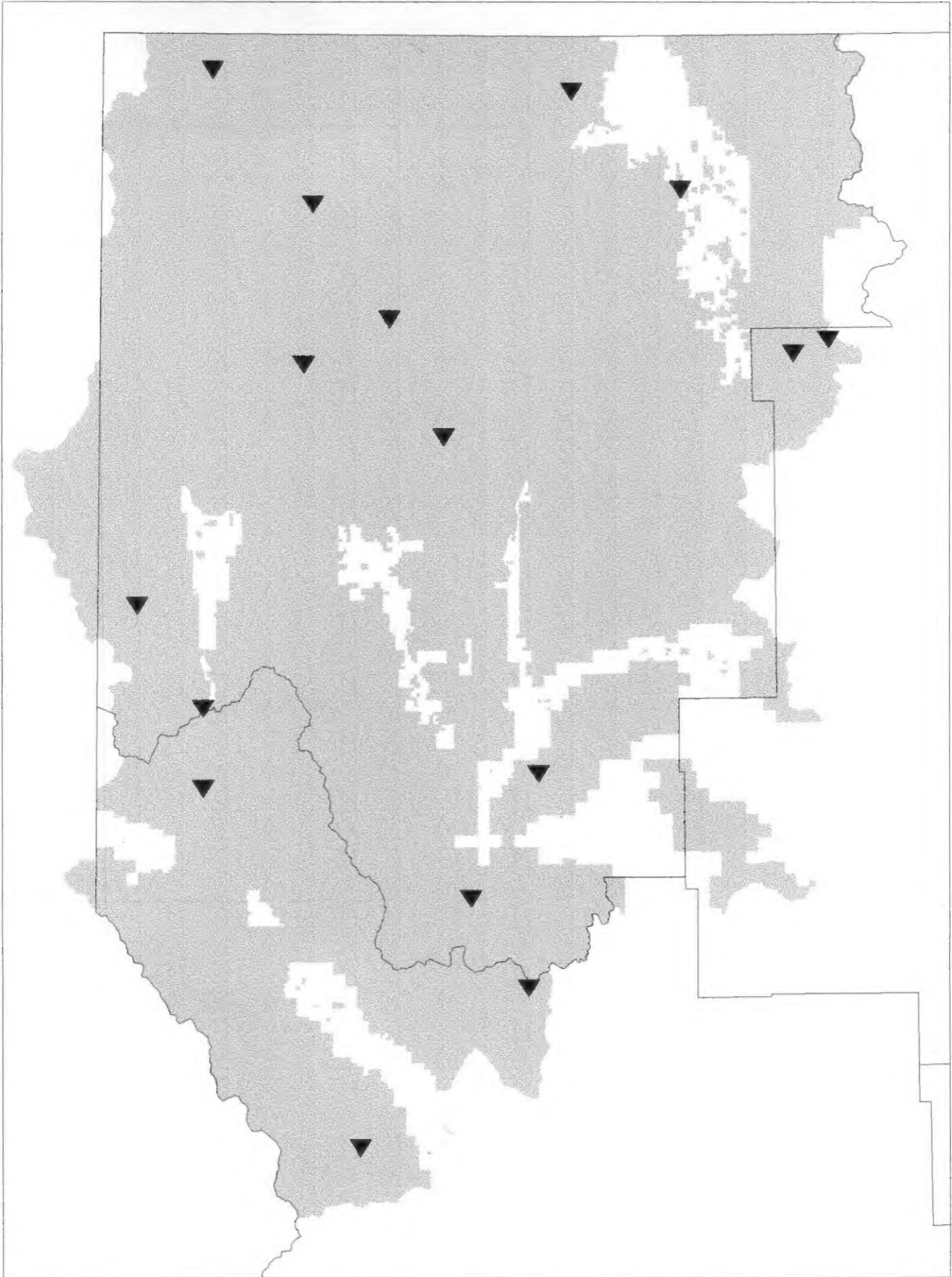
Table 1. Preliminary surveys of potential monitoring sites in the Kootenai National Forest, 1995.

District	Site*	Date	Species**	Adults Detected	Egg Masses	Tadpoles seen	Monitoring Potential	Monitored
Rexford	Wolf Creek Hdwat.	04/30	R. p. R. p.		32 23		Only 1 species	No
	Arnold's Pond	04/29	A. m. P. r.	1 3			Need subdivide	No
	Dodge Creek Pond	08/26	A. m. P. r.			10-100 1	Need subdivide	Yes
	Horse Lakes	06/01	P. r. R. p. A. m. R. p. B. b.			1-10 10-25 >100 >1000	Need subdivide	Yes
Three Rivers	Bad Med. CC Pond	04/27					Good	Yes
	Keeler Creek Pond	05/12	A. m. P. r. P. r.	5	25-50 50-100		Good	Yes
	Pete Crk Meadow	05/21	B. b. P. r.	10-12	5-10		Need subdivide	Yes
	Vinal Lake Rd. Pnd.	04/28	A. m. P. r.	6	2		Good	Yes
	Whitetail Cpgrd.	04/15	R. p. R. p.		3 10		Only 1 species	No

* A full description of the site is given in Appendix F.

** A. m. = *Ambystoma macrodactylum*; P. r. = *Pseudacris regilla*; R. p. = *Rana pretiosa*; R. pi. = *Rana pipiens*
B. b. = *Bufo boreas*.

Amphibian Monitoring Sites in 1995
On or near the Kootenai National Forest, Montana



Survey locations from the Montana Natural Heritage Program, February 01, 1996

district. Working with Forest Service biologists, 2-4 sites per district were ultimately chosen for monitoring.

A simple density method, the Suitable Shoreline Habitat Method (SSHM), was used for monitoring tadpoles and larvae; it is described in Appendix B. The SSHM densities required an adjustment due to human disturbance while sampling. The adjustment factor was called the Density Correction Factor (DCF; see Appendix B for its computation). SSHM densities multiplied by the DCF's produced Adjusted SSHM densities (tadpoles/larvae per ft²), which are considered closest to the true estimate.

In addition to monitoring species presence, data was collected on egg production. For the Spotted Frog (*Rana pretiosa*) egg numbers were estimated by volumetric displacement. This method involved 3 steps: 1) categorizing the egg masses as being Type I - small eggs in a tight compact mass, less than 72 hrs old; or Type II - larger eggs (or embryos) in a more loose mass, more than 72 hrs old; 2) determining the volume of all egg masses of each type by water displacement in a 3,000 ml volumetric container (this usually required 2-10 measurements); 3) determining a mean egg volume of Type I and II eggs by taking 10 samples of 20-50 eggs, counting the number of eggs and then measuring for volumetric displacement. The mean egg volume for each type was used to extrapolate to total egg numbers of the larger mass.

For the Long-toed Salamander (*Ambystoma macrodactylum*) and Pacific Chorus Frog (*Pseudacris regilla*) the total number of eggs in 20 and 22 egg masses respectively were counted. Due to time constraints, it was not possible to determine total egg production for the latter two species or the Western Toad.

Results:

The sixteen monitoring sites provide data for the Long-toed Salamander (16 sites), Pacific Chorus Frog (11 sites), Spotted Frog (14 sites), Northern Leopard Frog (1 site) and Western Toad (4 sites). At each site, the species present were identified and the adjusted SSHM densities determined by sampling the shoreline (Table 2).

Some of the highest densities were found among the Western Toad (0.498 tadpoles/ft²) at LaFoe Lake in the Libby district and the Pacific Chorus Frog (1.565 tadpoles/ft²) at the Bad Medicine Campground pond in the Three Forks district. Considerable variation existed in species densities from site to site, i.e. for the Long-toed Salamander, 0.003 larvae/ft² at the Silver Butte Fisher River oxbow to 0.738 larvae/ft² at the Bad Medicine Campground pond. Densities of the Spotted Frog ranged from 0.001 tadpoles/ft² at the Vinal Lake Road pond to 0.261 tadpoles/ft² at LaFoe Lake. There was no obvious correlation between larval densities and elevation but smaller ponds with considerable emergent vegetation usually had higher densities than larger lakes or marshes where only a portion of the shoreline was sampled.

As part of the SSH method, total lengths for the first 30 individuals of each species at a site were measured (Appendix C). The variation found in larval lengths reflected not only age differences, but water temperature, food supply and other environmental factors. Water temperature seemed to be particularly important as the

Table 2. 1995 Monitoring Data for the Kootenai National Forest using the Suitable Shoreline Habitat Method (SSHM)

District	Site	Date	Sp.*	#Sec.	Mean # Sweeps	Mean Sec. Area(ft ²)	Mean Tad /Section	SSHM Den. (Tad/ft ²)	Density Cor. Fac.	Adj. SSHM Density	Adj. Mean Tad/Sec
Cabinet	Big Beaver Creek	06/29	A.m.	3	14.3	286	02.0	0.007	3.514	0.025	007.3
			P.r.	3	14.3	286	04.3	0.015	3.700	0.056	015.9
			R.p.	3	14.3	286	02.7	0.009	3.560	0.032	009.2
	Gull River Oxbow	06/14	A.m.	9	06.0	120	00.9	0.007	3.514	0.025	003.0
			P.r.	9	06.0	120	09.9	0.082	5.262	0.431	051.7
	Willow Creek	06/29	A.m.	6	11.3	226	04.3	0.019	3.793	0.072	016.3
Fortine	Louis Lake	07/06	R.p.	6	11.3	226	04.5	0.020	3.817	0.076	017.3
			A.m.	6	10.5	210	04.0	0.019	3.793	0.072	015.1
			R.p.	6	10.5	210	01.5	0.007	3.514	0.025	005.2
	Lost Lake Marsh	06/25	A.m.	13	10.0	200	03.9	0.019	3.793	0.072	014.4
			R.p.	13	10.0	200	00.6	0.003	3.420	0.010	002.1
	Powerline Pond	06/16	A.m.	6	09.2	184	04.5	0.025	3.933	0.098	018.1
Libby	Blue Creek Marsh	07/06	P.r.	6	09.2	184	11.7	0.063	4.819	0.304	055.9
			R.p.	6	09.2	184	00.5	0.003	3.420	0.010	001.9
			A.m.	7	06.0	120	03.1	0.026	3.957	0.103	012.3
	Lafayette Lake	07/06	P.r.	7	06.0	120	03.0	0.025	3.933	0.098	011.8
			R.p.	7	06.0	120	00.1	0.001	3.379	0.004	000.5
			B.b.	7	06.0	120	03.4	0.029	4.029	0.117	014.1
Rexford	McKillop Rd. Pond	06/22	A.m.	6	06.2	123	01.8	0.015	3.700	0.056	006.8
			R.p.	6	06.2	123	06.8	0.056	4.656	0.261	032.1
			B.b.	6	06.2	123	11.1	0.091	5.472	0.498	061.2
	Silver Bull F. Riv.	08/22	A.m.	8	19.8	396	20.5	0.052	4.563	0.237	094.0
			P.r.	8	19.8	396	02.5	0.006	3.490	0.021	008.3
			R.p.	8	19.8	396	04.9	0.012	3.630	0.044	017.3
Rexford	Dodgson Creek Pond	06/25	A.m.	9	13.1	262	00.2	0.001	3.372	0.003	000.8
			P.r.	9	13.1	262	00.2	0.001	3.372	0.003	000.8
			R.p.	9	13.1	262	07.3	0.028	4.003	0.112	029.4
	Dodgson Creek Pond	06/25	A.m.	9	10.0	200	01.0	0.005	3.467	0.017	003.5
			P.r.	9	10.0	200	00.7	0.004	3.444	0.014	002.8
			R.p.	9	10.0	200	00.7	0.004	3.444	0.014	002.8

Table 2. 1995 Monitoring data for the Kootenai National Forest using the Suitable Shoreline Habitat Method (SSHM)

District	Site	Date	Site*	#Sec.	Mean # Sweeps	Mean Sec. Area(ft ²)	Mean Tad /Section	SSHM Den. (Tad/ft ²)	Density Cor. Fac.	Adj. SSHM Density	Adj. Mean Tad/Sec
	Horse Lakes	07/07	R.p.	9	10.0	200	00.1	0.001	3.362	0.002	000.3
			A.m.	6	14.8	296	03.2	0.011	3.607	0.040	011.7
			R.p.	6	14.8	296	06.7	0.023	3.187	0.009	026.5
			B.b.	6	14.8	296	09.3	0.032	4.096	0.131	038.8
Three Riv.	Bad Mnd. CC Pond	06/15	A.m.	9	06.0	120	14.4	0.120	6.148	0.731	081.5
			P.r.	9	06.0	120	23.7	0.197	7.143	1.515	187.8
			R.p.	9	06.0	120	00.8	0.007	3.514	0.025	003.0
			A.m.	6	05.3	106	10.0	0.094	5.542	0.521	055.2
	Pete Creek Meadow	06/30	P.r.	6	05.3	106	17.2	0.162	7.127	1.155	122.4
			R.p.	6	05.3	106	04.2	0.039	4.260	0.116	017.6
			A.m.	8	09.8	195	02.6	0.013	3.654	0.047	009.3
			P.r.	8	09.8	195	04.1	0.021	3.840	0.081	015.7
Vinal Lake Rd. Pond	Vinal Lake Rd. Pond	06/30	R.p.	8	09.8	195	05.4	0.028	4.003	0.112	021.9
			B.b.	8	09.8	195	00.3	0.001	3.381	0.004	000.9
			A.m.	12	10.8	216	02.2	0.010	3.584	0.036	007.7
			P.r.	12	10.8	216	03.1	0.014	3.677	0.151	011.1
			R.p.	12	10.8	216	00.1	0.001	3.360	0.001	000.3

* A.m. = *Ambystoma macrodactylum*; P.r. = *Pseudacris regilla*; R.p. = *Rana pretiosa*; R.pi. = *Rana pipiens*; B.b. = *Bufo boreas*.

larval lengths of all species at the Big Beaver Creek ponds, the Keeler Creek pond and the Silver Butte Fisher River oxbow (cold, spring-fed waters associated with streams) were noticeably smaller than comparable lengths at small ephemeral ponds such as the Bad Medicine Campground pond or the McKillop Road pond. The total length data was collected to help assess the age of the larval stage so that sampling can be done at approximately the same time in subsequent years.

The total number of eggs laid by the Spotted Frog varied from 3,589 at a temporary pond on the Vinal Lake Road to over 98,525 at a backwater on the Silver Butte Fisher River (Table 3). Although the total number of eggs could be computed at each site, it was impossible to determine the exact number of masses at some sites due to the communal egg laying habits of this species. Based on masses which were considered laid by a single female, the mean number of eggs per mass was 842 (Range 408-1344; Table 4). At one site, the Bull River Oxbow, over 5,000 eggs were laid but apparently none of them survived as no tadpoles were found during the monitoring session. Complete egg mortality was also observed at 5 sites during 1994.

The mean number of eggs/mass was estimated at 24 for the Long-toed Salamander and 45 for the Pacific Chorus Frog (Table 4). These figures did not represent a truly random sample and are only a general indicator of egg mass size.

Discussion:

The SSH method was developed as a means of producing quantitative data on species abundance without the time-personnel costs associated with mark-recapture or quadrat sampling. Having completed one season of use, some of the advantages/disadvantages can now be assessed.

Approximately 2 hours were required to monitor most sites if 2 or 3 individuals were involved. The sites had between 200-400 feet of suitable shoreline which included entire ponds or shorelines on lakes or marshes. The senior author monitored one site on his own (Lost Lake Marsh) requiring approximately 3 hours. In comparison to mark-recapture studies, the time-personnel savings were substantial, and in fact, mark-recapture studies would be impossible on larger lakes without fencing off a sampling area.

There did not appear to be any difficulty in understanding or carrying out the procedure among field workers. The most common problems were the varying amounts of bottom sediment taken up in the net during a sweep and trying to maintain a uniform sweep pattern in heavy vegetation. Both of these problems usually resolved themselves after the first few sweeps. There was no difficulty in identifying the 4 species of tadpoles/larvae encountered. However, if Leopard and Spotted Frog tadpoles are assumed to be co-existing, care must be taken in distinguishing the larger size and paler color of the Northern Leopard Frog tadpole.

A certain amount of variation was expected, and occurred, in determining the pond perimeter, section lengths and number of sweeps per section (see Appendix B for methodology). Some of this variation can be reduced by measuring the first two variables in a more precise manner, i.e. using a tape etc. Standardizing the number of

Table 3. Total egg production (Types I and II) of *Rana pretiosa* and *Rana pipiens* at sites in the Kootenai National Forest based on volumetric displacement (VD) of egg masses.

District	Site	Date	Species*	Type I - <72 hrs			Type II - >72 hrs			Total Eggs Produced**
				Est. #	Masses	VD(mm)	Est. #	Masses	VD(mm)	
Cabinet	Big Eddy Rec. Area	04/02	R. p.							
							Mult.		2235	
									1350	
									1700	
									2280	
									760	
									2180	
							Sum =		10505	15869
	Bull River Oxbow	04/03	R. p.							
				4		425	3		570	
						425			385	
						300			270	
						370	Sum =		1225	555
						1520				
Fortine	Lost Lake Marsh	04/29	R. pi.							
				1		370				
				Sum =		370				
Libby	Silver Butte F. R.	04/10	R. p.							
				5		225				
						220				
						350				
						350				
						340				
				Mult.		2080				
						610				
						2930				
						2330				
						2030				
						2230				
				Sum =		13695				98525^

Table 3. Total egg production (Types I and II) of *Rana pretiosa* and *Rana pipiens* at sites in the Kootenai National Forest based on volumetric displacement (VD) of egg masses.

District	Site	Date	Species*	Type I - <72 hrs		Type II - >72 hrs		Total Eggs Produced**
				Est. #	Masses	Est. #	Masses	
Three Riv.	Vinal L. Rd. Pnd.	04/2	R. p.	1		2		
				Sum =	425			
					425			35
Whitetail CC Pnd.	04/15	R. pi.				Sum =		
						Mult.		
						Sum =		458

* R. p. = *Rana pretiosa*; R. pi. = *Rana pipiens*.

** Total eggs produced = total volume displacement divided by single egg volume displacement. Single egg volume displacement figures (Type I = 0.417 cc; Type II = 0.662 cc) were derived from the combined data in Appendices D and E.

^ The total egg count was estimated to be three times the number measured.

Table 4. Number of eggs per mass for selected amphibians in the Kootenai National Forest.

Site	Species* A.m.	Site	Species* P.r.	Site	Species* R.p.	Site	Species* R.pi.
Bad Med. CC Pond	6	Bad Med. CC Pond	25	Bull Riv. Oxbow	1021	Lost Lake Marsh	817
	29		63		1017		
	62		45		719		
	18		49		887		
	31		55		861		
	27		50		582		
	40		56		408		
	26		72	Silver Butte F. Riv.	540		
	33		41		528		
Blue Lk. Rd. Pond	23		51		841		
	6		26		837		
	18	Bull Riv. Oxbow	48		815		
McKillop Rd. Pond	4		18	Vinal Lk. Rd. Pond	1019		
	35		63		1208		
	16		73		1344		
	27		56				
	5		26				
	10	Keeler Cr. Pond	46				
	16		27				
	46	McKillop Rd. Pond	46				
			38				
			21				
N =	20		22		15		1
Mean =	23.9		45.2		841.		887
St. Dev. =	15.0		16.0		8		
Max =	62		73		259.		
Min =	4		18		7		
					1344		
					408		

*A.m. = *Ambystoma macrodactylum*; P.r. = *Pseudacris regilla*; R.p. = *Rana pretiosa*; R.pi. = *Rana pipiens*.

sweeps per section could also be achieved by measuring the section length and then halving the length for the number of sweeps (instead of taking one sweep approximately every 2 feet as recommended). One individual suggested attaching a tape to the edge and then letting it unravel as the monitor walked out to the deep end of the section; the length of the section can be read from the tape and the number of sweeps determined before sampling began. These suggestions will have to be assessed both in terms of their increased accuracy and time involvement.

One problem that will arise in making annual comparisons is the variability created by sampling at different times each year. For example, if one sampled shortly after tadpoles hatched out one year, and 4 weeks into the larval period the next year, densities could differ significantly due to natural mortality. For this reason, we recommend that the low-mid elevation ponds (2700-4000 ft) be sampled during the first two weeks of June each year and the higher elevation ponds during the latter two weeks of June. Or alternatively, one should try and stay within a two week window from one year to the next. To further help assess this problem, we suggest measuring the first 30 individuals of a species in order to obtain mean lengths or else record the Gosner stage (Gosner, 1960) each year. If the mean lengths (or Gosner stages) are significantly different, annual comparisons should be interpreted with caution. Growth and developmental rates of tadpoles interact in a complex manner from one year to the next, depending on elevation, crowding, food supply, predators and weather (Alford and Harris, 1988; Brodman, 1995; Calef, 1973; Licht, 1974, 1975; Pfennig *et al.* 1991).

Considering the above factors, how much variation in size and numbers is to be expected each year with SSH method? And when do trends become significant? Since the methodology is new, it is impossible to give definitive answers to these questions, but reviews of the literature and field experience suggest the following: The total absence of a tadpole/larval species from one year to the next does not necessarily mean the population has been extirpated. As indicated earlier, it is not uncommon for egg masses of the Spotted Frog to suffer 100% mortality as a result of being laid at the edge of the water and then having water levels recede instead of increase early in the spring. This happened at five ponds in 1994 and at one pond in 1995. The same situation could happen with the Western Toad, but is unlikely to happen with the Pacific Chorus Frog or Long-toed Salamander which lay their eggs in deeper water. Since most adults are thought to live at least 2-3 years (longer for the Western Toad and Long-toed Salamander), several years without reproduction could be followed by a successful season. The total absence of breeding over a 3-year period, however, may be indicative of major problems at a site.

If reproduction is successful each year, the numbers of tadpoles/larvae will vary based on weather, mortality, disease etc. as discussed earlier. It is our belief that 5 or more years of annual data will be necessary to determine the normal variation that exists in species densities at a site using the SSH method. In the interim, the overall variation observed among sites can be used as a general guideline.

The accuracy of the Density Correction Factor (DCF) is the most problematic

part of the methodology at this point. Ideally, a DCF needs to be developed for each species based on SSHM/mark-recapture comparisons. For example, tadpoles of the Western Toad tend to school together more than the other three species. The percentage of toad tadpoles driven into the mud or out of the sampling section by the activities of the monitoring person may be different than similar activities for the Long-toed Salamander or Spotted Frog. Because of time constraints, we were not able to derive individual species DCF's this season but had to rely on a single DCF for all species combined. This problem is easily resolved by additional comparison and should be undertaken if the SSH method is to be adopted for long-term monitoring.

Extrapolation of the adjusted SSHM densities to a larger area, i.e. the entire pond is a matter of objectives and field discretion. In smaller, more uniform ponds, there is probably little error in extrapolating larval densities to larger areas. In larger, more diverse wetlands, especially if only a portion of the shoreline was subsampled, the extrapolation error magnifies considerably. Since the objective of this sampling was to compare densities in the same (or similar areas) annually, extrapolating beyond the sampling area was not deemed necessary.

Despite some of the problems mentioned above, we believe the SSHM method offers a simple and relatively fast method of estimating population numbers for annual comparisons. We are currently distributing the methodology to other workers in order to obtain their assessment and comments. As of this writing, we are recommending the SSH method be used for the 1996 field season.

Part II. - Status of the Western Toad, *Bufo boreas*.

Introduction:

The Western Toad has been of special concern to biologists in recent years because of dwindling populations throughout the west (Blaustein and Olson, 1991; Carey, 1993; U.S. Fish and Wildlife Service, 1994; Peterson *et al.* 1992). Additional concern arose when Blaustein *et al.* (1994a) showed that the eggs of the Western Toad were especially sensitive to UV-B radiation and may be suffering damage as a result of ozone destruction in the upper atmosphere. Apparently a worldwide pathogenic fungus is also contributing to toad declines in Oregon (Blaustein *et al.* 1994b).

Brunson (1952) regarded the Western Toad as one of the most common batrachians (frogs and toads) in western Montana. Black (1970) supported its common occurrence not only in the west but in many counties east of the continental divide. Our own surveys in the Kootenai National Forest (Werner and Reichel, 1994) showed only 10 breeding sites throughout the Forest in 1993-94. Reichel (1995a) found only one breeding site in the Lewis and Clark National Forest in 1994 and in the same year Werner and Plummer (1994) reported just 4 breeding sites on the Flathead Reservation. As a result of the above data, all known breeding sites from the 1993-94 surveys were re-surveyed, and special attention was given to checking historical locations and locating any additional sites.

Methods:

All surveys were of a time-constraint (Heyer *et al.* 1994) nature unless part of the monitoring process (above). Thirty minutes - 2 hours were spent at each site depending upon the size of the area and what was found. The entire shoreline or a major part thereof, was searched by walking slowly along the edge and up into the surrounding vegetation, including rolling over rocks and logs. At regular intervals, the aquatic habitat was sampled for tadpoles or larvae using dipnets.

Results:

From both historical records and the 1993-95 surveys, a total of 29 locations, including 15 breeding sites, are known from throughout the Forest (Figure 2). Two of these sites, Trego Pond and the Amish Colony Pond are on private land. Of the 10 known breeding sites from the 1993-94 surveys, 6 were used by adult toads in 1995 (Table 5). Of the four sites where breeding did not occur, one (Tepee Pond) was dried up and another, the Yaak River-Baldy Creek backwater site had very high water throughout the spring.

Five new breeding sites were found in 1995, only one of which was surveyed previously (Pete Creek Meadows). It is likely that all five sites had been used for breeding in the past based on historical records and comments from individuals (Table 5).

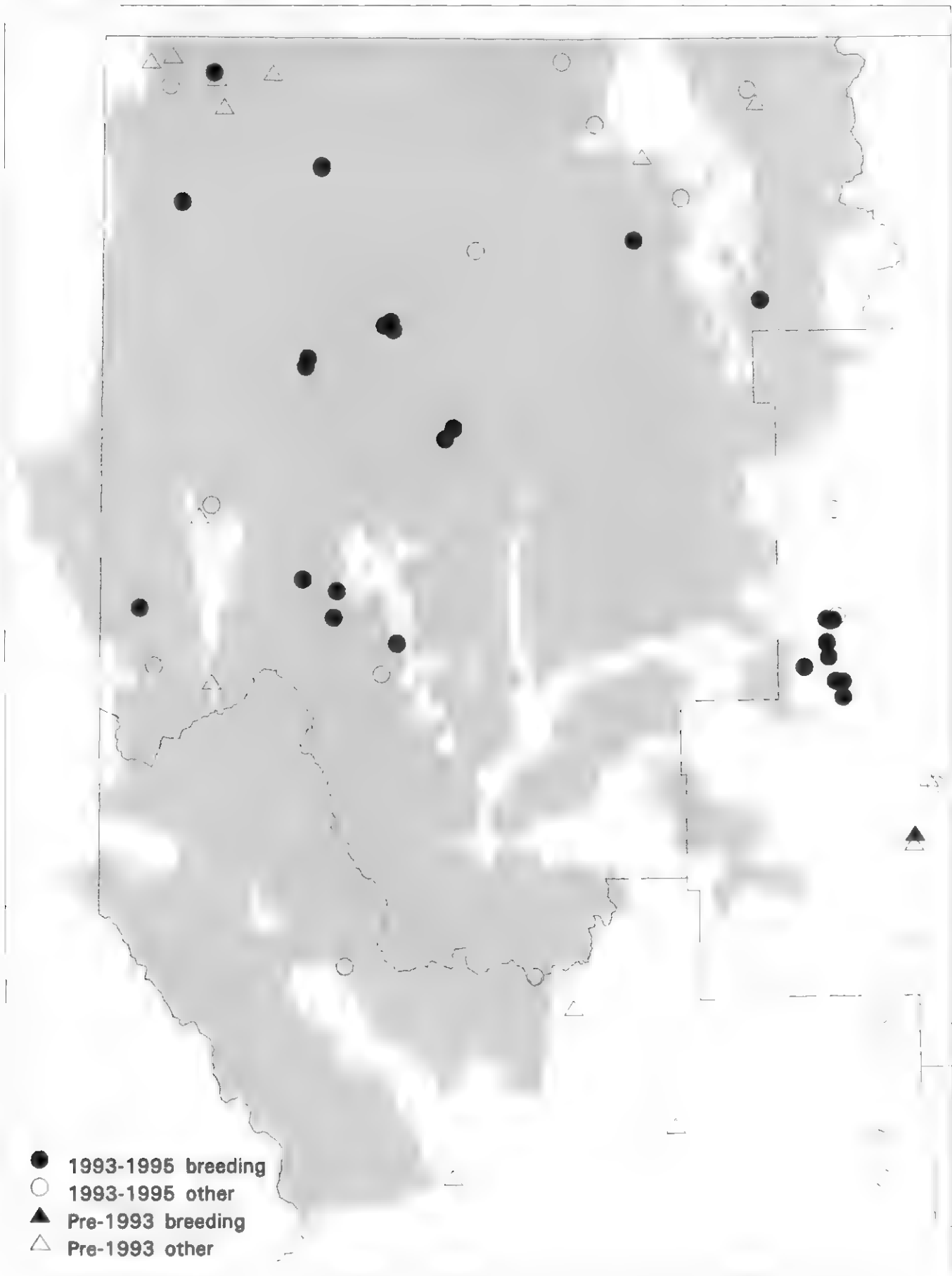
Discussion:

In discussing the status of the Western Toad, one must keep in mind that despite three summers of surveying, there are probably a number of breeding sites unknown to us. The Kootenai NF has large tracts which are not readily accessible and the Western Toad is not known for its specificity in breeding site selection. On the other hand, three summers of survey work involving 1-4 people and covering over 150 wetland sites provides a reasonable representation of species distribution.

The 1995 surveys increased our overall knowledge of breeding sites from 10 to 15, but breeding took place at only 11 of those sites during 1995. There are no reliable breeding records from one entire district (Cabinet), although there was one sighting in the Swamp Creek drainage in the fall of 1995. There was no breeding observed at any of the 10 high altitude ponds (>5,000 ft. elevation) surveyed this summer.

It is our opinion that the survival of the Western Toad is threatened in the Kootenai National Forest as elsewhere in western Montana. Whether this is due to UV radiation and the fungal disease mentioned above or some combination of the above with effects from grazing, logging, mining, habitat alteration, or other factors is unknown. In Idaho, populations at higher elevations seem to be more depleted than those at lower elevations suggesting a UV radiation factor (Dr. Charles Peterson, Idaho State University, personal communication). The U.S. Fish and Wildlife Service reviewed (March, 1995) a petition to list this species on the Federal Endangered Species list in the southern portion of its range (New Mexico, Colorado, Wyoming).

Bufo boreas (Western Toad) on the Kootenai National Forest



Species locations from the Montana Natural Heritage Program, January 12, 1996

Table 5. Summary of *Bufo boreas* breeding activity and sightings in the Kootenai National Forest through 1995.

District	Site	1993		1994		1995		Historical Records	
		Date	Breed Sight	Date	Breed Sight	Date	Breed Sight	Date	Breed Sight
Cabinet	Swamp Creek					09/15	1		
Fortine	Big Theriault Lk.							06/01/92	+
	Little Theriault Lk.					08/26	1		
	Frank Lake					08/23	1		
	Trego Pond					07/05	*		
Libby	Blue Lake			06/20	*	07/06	*		
	Blue Creek Hdwat.	06/15	*	06/20	-	05/31	*		
	Flower Lake	07/14	*	05/10	-	07/20	-		
	FS Rd 4792 Pond	07/09	*						
	FS Rd 278			06/16	1				
	LaFue Lake			06/18	*	06/01	*		
	Pipe Cr. E. F. Hdwat.	05/30	*			06/01	*		
	Sylvan Lake			06/10	1				
Rexford	Amish Cal. Pond					07/29	*		
	Baker Lake Area							1966	
	Big Creek, Lit. N.F.					08/05	2		
	Horse Lakes	05/30	*			06/01	*		
	Rexford Township					07/28	1		
	Tepee Lk. Pond E.	06/10	*			04/29	-		
Three Riv.	Hawkins Pond			07/16	1	06/30	-		
	Keeler Cr. Pond			04/29	-	05/12	*		
	Marmot Mtn.							06/29/66	+
	Northwest Peak							07/04/66	+
	O'Brien Creek					06/01	1	08/31/77	+
	Pete Creek Meadow			05/07	-	06/30	*	06/15/49	+
	Spar Lake					06/15	3		
	Vinal Lake			09/10	*	05/20	*		
	Yaak River, W.F.							06/26/66	3

Table 5. Summary of *Bufo boreas* breeding activity and sightings in the Kootenai National Forest through 1995.

District	Site	1993			1994			1995			Historical Records		
		Date	Breed	Sight	Date	Breed	Sight	Date	Breed	Sight	Date	Breed	Sight
	Yank Riv-Baldy Cr.	05/30	-	8				05/20	-	-			

* = presence of eggs, tadpoles or newly metamorphosed young

- = area surveyed but no individuals seen

+ = individuals sighted but number and age not given

Part III. - High Elevation Surveys.

Introduction:

Increases in elevation often hinder the ability of amphibians and reptiles to survive. Lower temperatures usually mean shorter growing seasons and smaller food supplies. The loss of protective cover can often result in more exposure to predators and possibly harmful UV radiation. Although elevation gains within the Kootenai NF are moderate, i.e. from approximately 2,000 - 7,000 feet, some trends in amphibian/reptile distribution have been noted from previous surveys. For instance, the Painted Turtle was not found above 3350 feet, and the Pacific Chorus Frog above 4,000 feet.

During the summer of 1995, an effort was made to survey some of the higher elevation ponds not covered in previous surveys in order to ascertain species presence and general trends in development.

Methods:

Time-constrained surveys were carried out as described in Part II.

Results:

Amphibian sightings at 35 sites above 4,000 foot elevation have now been made (Figure 3). Five of the sites are between 5000-6000 feet and six of the sites are above 6,000 feet (Table 6). The Pacific Chorus Frog was not found above 4300 feet, i.e. only at Pete Creek Meadows (4,290) and the Blue Creek Headwaters Marsh (4,000).

Three amphibian species, the Long-toed Salamander, the Spotted Frog and the Western Toad, and one reptile (Western Terrestrial Garter Snake) all extend above 6,000 feet in the Kootenai NF and are known to extend even higher in other areas of the Rocky Mountain region. Of the 11 ponds above 5,000 feet, the Long-toed Salamander was found at 7 and the Spotted Frog at 5.

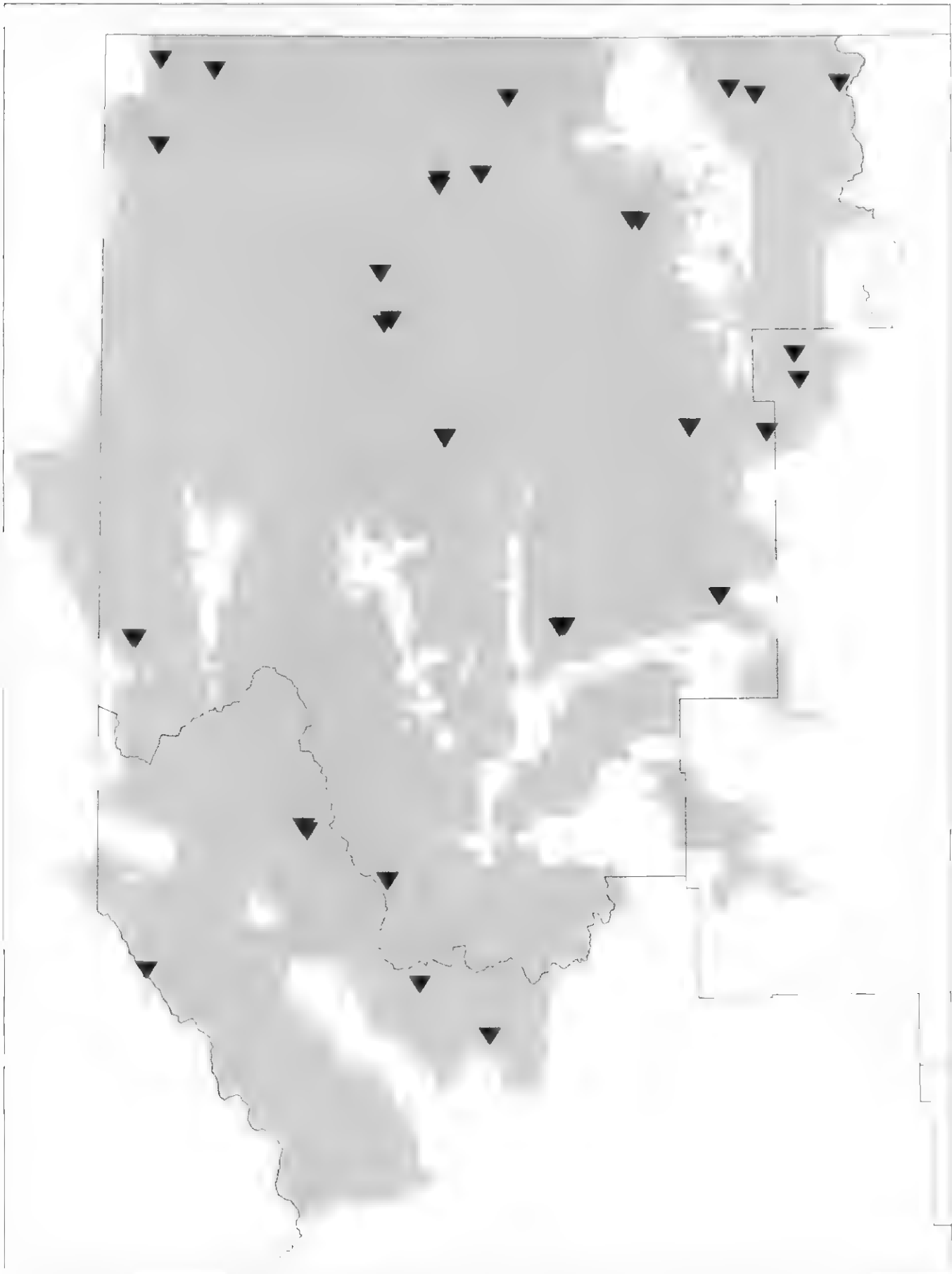
At the six highest elevation ponds (Ulm Peak Ponds, Copper Lake, Cliff Lake, Boulder Lakes), measurements of Long-toed Salamander larvae showed far less variation in total lengths than larvae at lower elevations (Appendix C). The implication is that at higher elevations the reproductive period is shorter and more intense, thus producing a more uniform size class. The Spotted Frog was found at only one of the six ponds mentioned above (Ulm Peak) but tadpole sizes were not recorded.

Discussion:

Single adults of the Western Toad have been seen above 6,000 feet in the Northwest Scenic Peaks and Ten Lakes Scenic areas but neither eggs or tadpoles were observed in 1995. This may be a factor of sampling and/or factors related to its overall decline discussed previously.

Based on occurrence, the Long-toed Salamander apparently has evolved a better strategy for high altitude survival than either of the two Anuran species. Studies by Sexton and Bizer (1976), and Bizer (1978) on high elevation populations of the Tiger Salamander in Colorado, suggest that both neoteny (extending the larval period) and paedogenesis (extension of the neotenic condition to include sexual maturity)

**High Elevation (>4000 ft) Amphibian & Reptile Survey Sites
On or near the Kootenai National Forest, Montana**



Survey locations from the Montana Natural Heritage Program, February 01, 1996

Table 6. Survey results of wetland over 4,000 feet elevation in the Kootenai National Forest, 1993-1995.

District	Site	Elevation	Date	Species*	Breed**	Juv/Adult
Cabinet	Cliff Lake	6480	07/07/95	A.m.	+	
	Copper Lake	6450	07/07/95	A.m.	+	
	Elk Lake	4220	05/05/93	R.p.		13
	Frog Lake	4380	09/05/93	A.m.	+	3
				R.p.	+	37
	Rush Lake	5353	07/12/93	A.m.	+	
				R.p.	+	6
	Ulm Pk. No. Pond	5650	07/10/95	A.m.	+	
	Ulm Pk. So. Pond	5660	07/10/95	A.m.	+	
				R.p.	+	38
Fortine	Big Therriault Lk.	5600	08/01/94	R.p.		2
	Little Therriault Ar.	6380	08/26/95	B.b.		1
	Louis Lake Pond ¹	4910	07/07/95	A.m.	+	
	Louis Lake ¹	4920	07/07/95	A.m.	+	
				R.p.	+	1
	Paul Creek Pond	4380	07/07/95	a.m.	+	
				R.p.	+	
	Sunday Creek Ponds	4793	05/14/94	R.p.	+	3
	Weasel Lake	5263	08/01/94	R.p.		3
Libby	Blue Creek Hdwat. ¹	4000	07/06/95	A.m.	+	
				P.r.	+	
				R.p.	+	9
				B.b.	+	1
	Cody Lake, Upper	4900	09/08/94	A.m.	+	
	Cody Lake, Middle	4860	09/08/94	A.m.	+	
	Cody Lake, Lower	4680	09/08/94	R.p.		7
	Geiger Lake	4720	06/11/94	R.p.		2
	Pipe Cr. E.F. Hdwat. ¹	4240	06/01/95	A.m.	+	
				R.p.	+	1
				B.b.	+	
	Sinclair Cr. E. Pond	4800	06/19/93	A.m.	+	
				R.p.	+	2
	Weigel Creek	4240	06/28/94	R.p.		1
Rexford	Boulder Creek	4550	06/27/94	R.p.	+	2
	Boulder Lake, Lower	6070	08/01/95	A.m.	+	
	Boulder Lake, Upper	6250	08/01/95	A.m.	+	
	Dodge Creek	4410	08/17/94	R.p.		2
	Drop Creek Pond	4028	07/07/95	A.m.	+	
				R.p.	+	
	Horse Lakes ¹	4240	07/07/95	A.m.	+	
				R.p.	+	3
				B.b.	+	

Table 6. Survey results of wetland over 4,000 feet elevation in the Kootenai National Forest, 1993-1995.

District	Site	Elevation	Date	Species*	Breed**	Juv/Adult
Three Rivers	Tepee Lake ¹	4400	05/17/94	A.m.	+	
	Tepee Lake, Pond E.	4340	06/10/93	A.m.	+	
				B.b.	+	
	Hawkins Lake ¹	6180	08/20/94	R.p.	+	1
				B.b.		
	Pete Creek Meadows ¹	4290	06/30/95	A.m.	+	
				P.r.	+	2
				R.p.	+	
				B.b.	+	
	Spread Creek	4160	07/15/94	R.p.	+	
	Spruce Lake Pond	4090	07/21/95	A.m.	+	
	Spruce Lake	4110	07/21/95	R.p.	+	

¹ Additional surveys have been made at these sites but no additional species have been found. Additional survey data are given in Appendices A-C of the 1994 Report and Appendices G and I of this Report.

* A.m. = *Ambystoma macrodactylum*; P.r. = *Pseudacris regilla*; R. p. = *Rana pretiosa*; B.b. = *Bufo boreas*.

** + = eggs, tadpoles or newly metamorphosed young.

become more common with altitude. These developmental strategies apparently allow for a more stable environment for a longer period of time, at least in semipermanent or permanent ponds (Sprules, 1974). All of the larvae measured in the June-July sampling at the high elevation ponds were 2-3 inches in total length. This implies that they were probably in their 2nd year of larval development. Given that most of the larvae we have observed at lower elevations metamorphose at the end of the first year, neoteny may well be operational in high altitude ponds in the Kootenai National Forest.

Part IV. - Species range extensions with particular emphasis on the Northern Leopard Frog, *Rana pipiens*.

Introduction:

The 1993-94 survey results (Werner and Reichel, 1994) indicated that 4 species of amphibians (Idaho Giant Salamander, Tiger Salamander, Northern Leopard Frog, and Wood Frog) and 3 species of reptiles, (Western Racer, Bullsnake and Prairie rattlesnake) may exist in the Kootenai National Forest for which there are no museum or recent records. Their possible presence is based either on historic records, unconfirmed reports or proximity to known localities.

Given the known range of the Tiger Salamander, Northern Leopard Frog, and three snake species, it is most likely that these species will be found in the eastern or southern portions of the Forest. The Idaho Giant Salamander most likely will be found in the western region and the Wood Frog along the northern border or at high altitudes.

As time permitted, efforts were made in 1995 to confirm the presence of some of these species.

Methods:

Time-constrained surveys were carried out as described in Part II.

Results:

Surveys in the southeastern region, i.e. Elk Creek and Thompson River drainage failed to reveal the presence of any of the three snake species. Reports were received of the Bullsnake in Eureka and at the Dancing Prairie Nature Conservancy area (Biologists, Rexford District) but no museum records have been secured to date.

The presence of the Tiger Salamander was confirmed in the Fortine district. Individuals were seen by the senior author and Guenter Heinz, Wildlife biologist at the Fortine district in Frank Lake, south of Eureka. Reports were also received of its presence in ponds near Frank Lake, Costich Lake, Black Lake, and two other sites in the immediate vicinity. In late fall 1995 a specimen collected near Frank Lake was obtained by Louis Young on the Rexford District, the first specimen from western Montana collected for over 50 years. It appears to be fairly widespread in the Eureka area, but is a disjunct population in western Montana.

No Wood Frogs or Idaho Giant Salamanders were found. Unconfirmed reports

of large salamanders in the Smith Lake area and several ponds west of Spar Peak in the Three Rivers district, may be Tiger Salamanders or less likely, Idaho Giant Salamanders.

A 1988 report of a Snapping Turtle (*Chelydra serpentina*) on Elk Creek Road just south of Beaver Creek Road was found. Snapping Turtles are not native to western Montana. Whether this was an introduced individual or part of an introduced populations is unknown.

Northern Leopard Frog:

The Northern Leopard Frog was found in one locality in the Fortine district, south of Eureka. It appears to be an isolated population confined to a small marsh area between Rock and Lost Lakes. Only one egg mass was found in early spring surveys. Sampling in June showed the presence of tadpoles and 10-15 adults. On 25 August, 5 young were sighted which would indicate at least some tadpoles successfully metamorphosed. No other populations were found in surrounding marshes or lakes.

The Northern Leopard Frog has undergone serious decline throughout its range including in Colorado (Corn and Fogleman, 1984) and Montana (Reichel, 1995a; Reichel, 1995b; Werner and Plummer, 1994). There are over 35 historical sites of Northern Leopard Frogs west of the continental divide in Montana (Montana Natural Heritage Program database), but the discovery of the population south of Eureka brings the number of known surviving populations to only two. A third population may exist near Noxon where individuals were sighted during a 1985 survey associated with the ASARCO Rock Creek Project (pp 3-81, Draft EIS, 1995). Surveys of the Noxon site during the past summer failed to show any Northern Leopard Frogs.

The existing population in the Fortine District is in a precarious situation given the small size (perhaps 10-20 breeding adults) and total isolation. It exists within a Forest Service grazing lease but grazing effects did not appear to be problematic this past summer. That could change if there was a dry summer and/or increased livestock use. Garter snakes were common in the marsh and undoubtedly prey on Northern Leopard Frogs as do certain bird species. The greatest mortality probably comes from aquatic insects and physical factors which kill egg and larval stages.

There are two smaller ponds in the immediate vicinity which could possibly be populated with tadpoles (two adults were seen at one of the ponds but no reproduction occurred). Efforts to populate these other ponds will undoubtedly depend on egg production at the existing site next spring.

CONCLUSIONS

1. As the basis for a long term monitoring program, a procedure called the Suitable Shoreline Habitat Method (SSHM) was developed for determining the presence and density of amphibian larvae/tadpole species in various wetland situations.

2. The SSHM was implemented at 2-4 sites on each district resulting in the Long-toed Salamander being monitored at 16 sites, the Spotted Frog at 14 sites, the Pacific Chorus Frog at 11 sites, the Western Toad at 4 sites and the Northern Leopard Frog at 1 site.
3. General information on egg production was gathered for three species: Total egg production for the Spotted Frog varied from 3,589 - 98,525 eggs at 5 sites; the mean eggs/mass was estimated at 841. The mean number of eggs per mass for the Long-toed Salamander was 24 and for the Pacific Chorus Frog 45. The latter two figures are only general indicators and did not represent a random sample.
4. Cumulative survey data from 1993-95, plus evidence from surrounding areas, indicates that the survival of the Western Toad is threatened. Western Toads were known to have bred at 15 sites on the Kootenai National Forest. They were seen at 16 sites and found breeding at 11 sites in 1995 and at 15 sites with breeding at 10 sites in 1993-94.
5. Surveys of 11 lakes/ponds over 5,000 feet elevation showed the presence of 3 amphibians (Long-toed Salamander, Western Toad and Spotted Frog) and one reptile, the Western Terrestrial Garter Snake. The Long-toed Salamander was the most common species and may be utilizing neoteny in its reproductive patterns. No breeding was observed in the Western Toad.
6. Discovery of the Northern Leopard Frog at a pond in the Fortine District, south of Eureka is currently the only known population of this species in the Kootenai National Forest and northwest Montana. The estimated population size was 10-15 adults. The observation of a single egg mass, an undetermined number of tadpoles, and 5 recently metamorphosed young indicated limited reproductive success during the past year.
7. The presence of the Tiger Salamander was confirmed at one site in the Fortine District, i.e. Frank Lake, with numerous sightings from surrounding areas of the Fortine and Rexford districts.

RECOMMENDATIONS

1. The long term monitoring which was established at 2-4 sites in each district should be continued and expanded. We recommend that at least four sites per district be monitored in a quantitative manner, i.e. Suitable Shoreline Habitat Method (SSHM) or other, and that another 5-10 sites be sampled using a time-constrained method, i.e. a 30-60 minute walk through survey. Please submit data to the Montana Natural Heritage Program, which is the central depository for amphibian survey and monitoring

data from Montana in cooperation with the regional Declining Amphibian Task Force.

2. Mark-recapture studies should be carried out on 5-10 ponds in order to establish a species specific regression line and Density Correction Factor for use with the SSH method. Current data analysis relies on a species composite Density Correction Factor which may not be accurate given different tadpole/larvae behavior patterns.

3. In view of the 1993-95 surveys and data from surrounding areas, we recommend that the Forest Service list the Western Toad as a **Sensitive species** throughout the Northern Region including the Kootenai National Forest.

4. We recommend that all past breeding sites of the Western Toad be monitored in the coming year and any areas that are under consideration for mining or extensive logging operations be surveyed thoroughly for its presence and breeding activity. This is particularly important in higher elevation areas where the potential for UV damage is greater and where several adults have been sighted but no eggs or tadpoles seen.

5. Comparative studies should be undertaken between low and high elevation populations of the Long-toed Salamander and Spotted Frog including gathering data on egg production, tadpole and adult numbers. This information could provide valuable insights into future management decisions regards both mining and logging.

6. Based on the presence of a single known population of the Northern Leopard Frog within the Forest, and several historical records, we recommend that the Forest Service list the Northern Leopard Frog as a **Sensitive species** throughout the Northern Region including the Kootenai National Forest.

7. Special protection and research should be considered on the single Northern Leopard Frog population on the forest. Options for research and protection may include: a) shading/protecting egg masses; b) fencing off the pond from livestock; c) reduction of normal predators (garter snakes, etc.); and/or d) closely monitoring the population to determine reproductive success and times/causes of greatest mortality. This population is a prime candidate (one of only two current populations) for use in reintroduction of Northern Leopard Frogs to historic sites in western Montana. Plans to increase the population at the site and at nearby sites should be made as soon as possible. Planning should ensure that the current population is not compromised.

8. The Coeur d'Alene Salamander (Sensitive species) and Tailed Frog are not covered in the above monitoring program because of their specific habitat requirements. They should be monitored separately as suggested in the previous report (Werner and Reichel, 1994). A procedure for use with the Coeur d'Alene Salamander has been described by Cassirer *et al.* (1994). Monitoring of Tailed Frogs could be done in conjunction with fish monitoring by electro-shocking.

9. Efforts should continue to be made to increase our knowledge of the range and biology of those species which are either uncommon (Tiger Salamander, Northern Alligator Lizard) or for which no museum records exist within the Forest (Idaho Giant Salamander, Wood Frog, Western Skink, Bullsnake, Racer, Prairie Rattlesnake). One of the most efficient ways of accomplishing these objectives is to encourage individuals to fill out incidental sighting reports and submit them to the Montana Natural Heritage Program for entrance into the species database.

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APPENDIX A.
DATA SHEETS USED FOR
AMPHIBIAN AND REPTILE
MONITORING, SURVEYS AND OBSERVATIONS

AMPHIBIAN SURVEY DATA SHEET: INSTRUCTIONS This data sheet is designed to facilitate quick recording of data from field surveys of amphibians and their habitats. It appears complex and intimidating, but actually can be completed in a short amount of time after a minimum amount of training. Many variables require only the correct choice to be circled, and the remaining variables are numerical and easy to determine. The data sheet is divided into four sections, divided by double lines. Each section describes a cohesive set of variables. In addition the back of the sheet includes a grid for a rough sketch of the site and space for additional comments. The map is optional, but the future value of the data is enhanced if it is supplied.

SECTION 1 - LOCALITY *These data are essential. Many amphibian surveys have been hampered by the inability to relocate exact locations in the historical record. Some of this information can be completed in the office after the survey.*

DATE: Use the format DD-MMM-YY (e.g., 05-APR-92).

BEGIN TIME: List the time survey of habitat for amphibians began in 24 hour format.

END TIME: List the time the survey ended in 24 hour format. (The total time (END TIME - BEGIN TIME) should reflect only the amount of time spent searching for amphibians. Total time plus number of observers may be used to assess relative abundance.)

OBSERVERS: List names or initials of all persons involved in searching.

LOCALITY: Describe the specific geographic location of the site. Use air distance in two directions (e.g., 5km N and 7.5 km W) of a map landmark that likely will not change (distance from a large town or city is not all that helpful).

STATE: Use the 2-letter abbreviation.

COUNTY:

MAP NAME: List the name of the U.S.G.S. quadrangle or other map used to locate the site.

OWNER: List the public land manager (e.g., Roosevelt Nat. Forest or Rocky Mtn NP), or name of the owner if the site is on private land (listing the owner's name will make it clear that you did not trespass to survey the site).

ELEVATION: Circle the scale used; meters are preferred.

T: township R: range S: section

SECTION DESCRIPTION: Describe the location of the site within the section (e.g., SE ¼ or NE ¼ of SE ¼)

UTM ZONE, NORTHING, EASTING: Universal Transverse Mercator coordinates

are preferred over longitude and latitude. The UTM zone is listed on newer topographic maps. If you are using a map without the UTM grid, substitute latitude for Northing and longitude for Easting.

SECTION 2 - SPECIES DATA *List all amphibian species observed. If garter snakes are seen, list them here also.*

SPECIES: Use the scientific name. Convenient shorthand is to use a 4-letter code made up of the first 2 letters of the genus and species (e.g., *Rana sylvatica* would be RASY).

ADULTS/JUVENILES: Indicate presence with a check, but numbers seen are more valuable data

CALLING?: Circle Y if frogs are vocalizing in a breeding chorus, of if a breeding aggregation of species that don't call (e.g., *Bufo boreas*) is observed.

TADPOLES/LARVAE: Same as for adults/juveniles

EGG MASSES: Same as above. Numbers of egg masses are especially valuable data. If possible, describe the developmental stage of eggs in the space for additional notes on the back of the form.

METHOD: Circle how observations were made: **VISUAL/AURAL ID** - species identified without picking it up, either by sight or by recognition of the breeding call; **HAND COLLECTED** - animal was picked up and identified in the field (higher confidence than visual id); **DIP NET/SEINE** - the usual method of collection for larvae; **TRAPPED** - minnow-type traps are also used for larvae; **VOUCHER COLLECTED?** - circle yes or no (voucher specimens are recommended for every site, especially if identification is uncertain and for larvae). Indicate voucher status in addition to method used.

FISH PRESENT?: If yes, list species if you

can. Circle the question marks if you are not certain, but suspect that fish are present. **ENTIRE SITE SEARCHED?:** If no, list either the meters of shoreline or the area (m²) of habitat (e.g., amount of wet meadow) searched.

SECTION 3 - PHYSICAL AND CHEMICAL DATA *Water chemistry data are difficult to collect accurately without thorough planning and quality equipment; these data are optional. Weather data are important for determining the quality of the observations (e.g., was an absence of amphibians due to observations made during a blizzard?)*

WEATHER, WIND: Indicate atmospheric conditions

AIR TEMPERATURE: Take at chest height in shade. The Celsius scale is preferred.

WATER TEMPERATURE: Take 1 meter from margin and at 2 cm depth, or where egg masses are observed.

COLOR: This is a qualitative assessment of whether the water clear or tea-colored from organic (humic) acids.

TURBIDITY: This is a qualitative assessment of whether the water clear or clouded from suspended particulate matter.

SECTION 4 - HABITAT DESCRIPTION *These data are important for developing hypotheses to explain changes in abundance of amphibians. This section needs to be filled out only once for each site (a reasonable amphibian survey should include at least 2 - 3 visits to each site in one season).*

ORIGIN: Decide whether the lake is a natural geologic formation or man-made. Bodies of water enlarged by a dam are problematic. List them as man-made, but add an explanation in the space for additional notes on the back of the form.

DRAINAGE: Circle whether the site has permanent drainage, no drainage, or

occasional drainage. Determining the potential for occasional drainage requires judgement. Look for clues in the topography and vegetation.

DESCRIPTION: Decide how best to describe the site. If there is evidence of past or present beaver activity, circle one of these choices in addition to your choice.

LENGTH, WIDTH: Record the maximum length and width of lakes and ponds. For streams, record the length and average width of the reach searched.

MAXIMUM DEPTH: Most times, you will not have access to a boat, so estimate depth (deep lakes are usually not important to amphibians).

STREAM ORDER: This is an index of stream size, and you will need a topographic map to determine it. First-order streams have no tributaries, second-order streams are formed by the confluence of two 1st-order streams, third-order streams are formed by the confluence of two 2nd-order streams, and so on.

PRIMARY SUBSTRATE: Circle the type that covers the majority of the bottom of the site.

EMERGENT VEGETATION: Circle the percentage of the margin of the site with emergent vegetation present, and list the dominant species. If you are botanically-disadvantaged, list the categories of the dominant species (e.g., cattail, sedges, etc.).

NORTH SHORELINE CHARACTERS: Describe the north shore of a lake or pond in terms of shallow water and emergent vegetation. This is important in evaluating quality of breeding habitat in some mountain locations.

FOREST CHARACTERS: List the closest distance between the water and the surrounding forest, and list the most common tree species. Leave these fields blank if there is no forest. Describe other surrounding habitat types in the notes section on the back of the form.

AMPHIBIAN SURVEY DATA SHEET - US FISH & WILDLIFE SERVICE, 4512 McMURRAY AVE, FT. COLLINS, CO 80525-3400

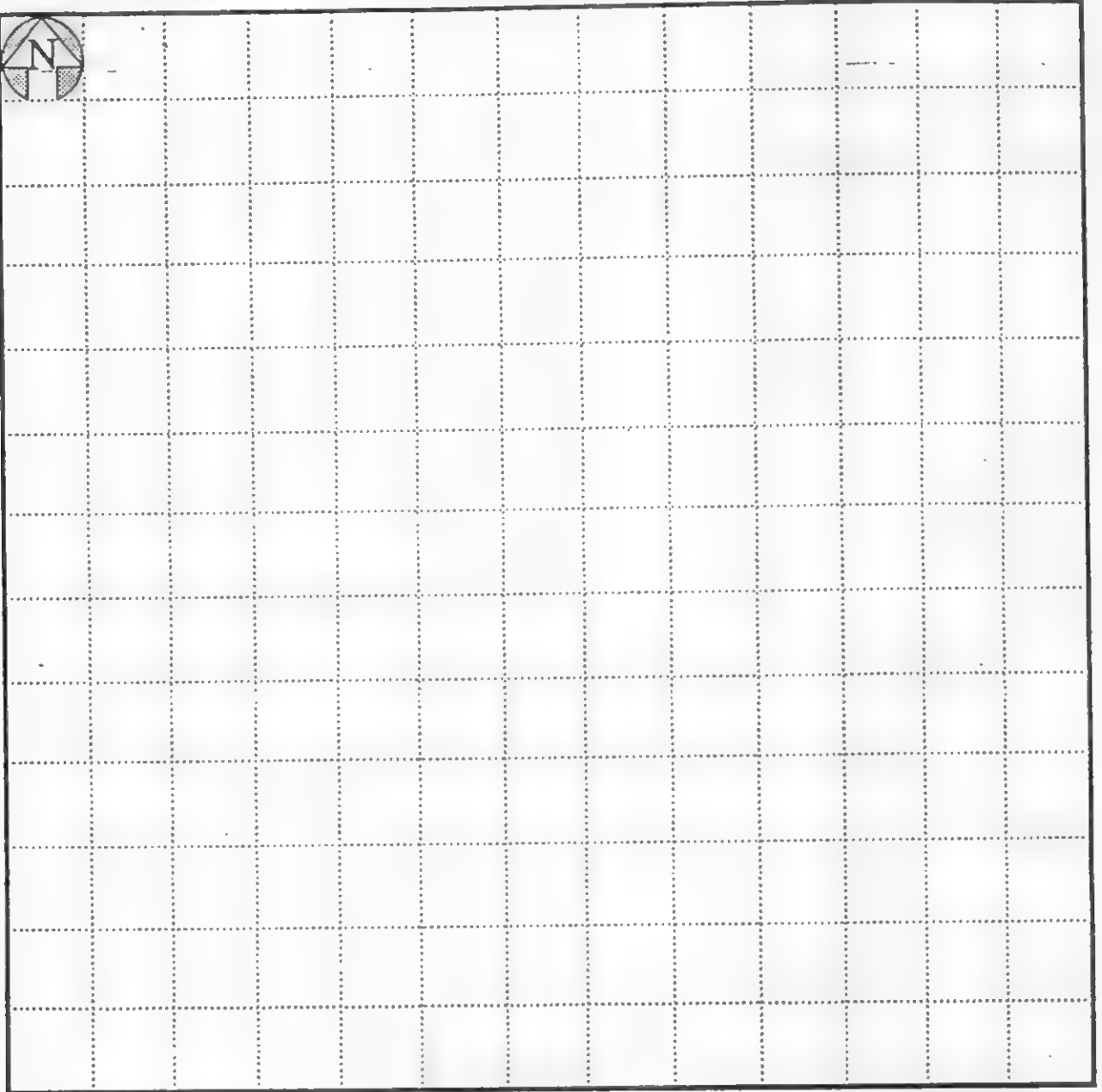
(circle choice for shaded variables; supply value for others)

(ver. 2/7/92)

DATE		START TIME		END TIME		OBSERVERS	
LOCALITY							
STATE		COUNTY		MAP NAME		ELEVATION (circle scale) M FT	
T	R	S	SECTION DESCRIPTION	UTM ZONE	NORTHING (or LAT)	EASTING (or LON)	
AMPHIBIAN AND/OR GARTER SNAKE SPECIES PRESENT (INDICATE NUMBERS IN CATEGORIES IF POSSIBLE)							
CIRCLE METHOD AND INDICATE IF VOUCHER SPECIMEN WAS COLLECTED							
SPECIES		ADULTS/JUVENILES		CALLING?		TADPOLES/LARVAE	
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
FISH PRESENT?		YES ??? NO		FISH SPECIES:			
ENTIRE SITE SEARCHED?		YES NO		IF NO, INDICATE AREA		METERS OF SHORELINE M ² OF HABITAT	
PHYSICAL AND CHEMICAL ENVIRONMENT (CHEMISTRY VARIABLES OPTIONAL - USE EXTRA SPACES FOR ADDITIONAL MEASUREMENTS)							
WEATHER:		CLEAR		OVERCAST		RAIN SNOW	
WIND:		CALM		LIGHT		STRONG	
AIR TEMP (circle scale)		°C °F		WATER TEMP (circle scale)		°C °F	
COLOR:		CLEAR		STAINED		TURBIDITY:	
pH		ANC				CLEAR CLOUDY	
SITE DESCRIPTIONS - (SKETCH SITE AND PUT ADDITIONAL COMMENTS ON BACK OF SHEET) OMIT THIS SECTION IF DATA HAVE BEEN COLLECTED ON A PREVIOUS VISIT							
NATURAL		MAN-MADE		DRAINAGE:		PERMANENT OCCASIONAL NONE	
DESCRIPTION:		PERMANENT LAKE/POND		TEMPORARY LAKE/POND		STREAM SPRING/SEEP ACTIVE BEAVER POND INACTIVE BEAVER POND	
SITE LENGTH (M)		SITE WIDTH (M)		MAXIMUM DEPTH:		< 1 M 1 - 2 M > 2 M	
STREAM ORDER		1		2		3 4 5 +	
PRIMARY SUBSTRATE:		SILT/MUD		SAND/GRAVEL		COBBLE BOLDER/BEDROCK OTHER	
% OF POND LAKE MARGIN WITH EMERGENT VEGETATION:		0		1 - 25		25 - 50 > 50	
EMERGENT VEGETATION SPECIES (LIST IN ORDER OF ABUNDANCE)							
NORTH SHORELINE CHARACTERS:		SHALLOWS PRESENT		SHALLOWS ABSENT		EMERGENT VEG PRESENT EMERGENT VEG ABSENT	
DISTANCE (M) TO FOREST EDGE		FOREST TREE SPECIES:					

ROUGH SKETCH OF SITE

GRID SPACING IS ____ METERS BETWEEN LINES



ADDITIONAL NOTES: particularly nesting substrate

Miscellaneous Observation Form
 Montana Natural Heritage Program
 1515 E 6th Ave
 PO Box 201800
 Helena, MT 59620-1800

Observer _____
 Address _____
 Phone No. _____



INSTRUCTIONS" Please use this sheet to submit sight, call, or specimen records of any Montana amphibian or reptile species. Use a separate line for each species and site. On the back of the sheet include any additional comments or supporting information. Please provide as specific location information as possible, particularly for the following species of special concern: Coeur d'Alene Salamander, Idaho Giant Salamander, Tailed Frog, Canadian Toad, Wood Frog, Snapping Turtle, Spiny Softshell, Short-horned Lizard, Sagebrush Lizard, Western Hognose Snake, and Smooth Green Snake. Documentation is required for Idaho Giant Salamander and Wood Frog (photo, through description, verification by experienced observer, etc.). An identification guide is available in the May/June 1995 issue of Montana Outdoors (reprints available at the MT Nat. Heritage Prog).

Species	Location	County	Township Range Section or UTM	Date Mo/Day/Yr	Time	# Adults	# Larvae
Example: Leopard Frog	McNab Pond	Carter	T01N R59E Sect 19 NE	5/20/94	8:30a	5	100s
Example: Milk Snake	3.4 mi W, 1.2 mi N of Harlowton	Wheatland	5145.2N 584.7E	8/15/94	11:15p	1	
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							

Comments: Include method of observation, measurements, documentation for species of special concern, disposition of specimens, weather, etc. Numbers correspond to those on the other side of this sheet. Use additional space or sheets if necessary.

Example: Sunny warm day, about 75°. Adults (3 seen; 2 heard calling only) at margin of ponds in cattails. Very small tadpoles seen; 1 egg mass still present.

Example: Found dead in the road in sagebrush flat near rimrocks; 24" long; Colored with bands of yellow / black / red / black / yellow...; deposited in MSU Museum

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

PAGE

Personnel:

Comments:

DATA

DATA

DATA

*Total Search Time = elapsed time X the number of "teams" monitoring

Geopol. Ent.

DATA

[illegible]

Appendix B.

A Quantitative Method for Assessing Amphibian Larval Density

The method is referred to as the Suitable Shoreline Habitat Method (SSHM) . It is based on the assumption that most amphibian tadpoles/ larvae are to be found along the shoreline, in water less than two feet deep, and where there is adequate emergent vegetation providing food and cover, i.e. suitable shoreline. A reasonable estimate of population density is obtained by sampling a minimum of 25% of the suitable shoreline.

Procedure:

If nothing is known about the wetland beforehand, we recommend a walk-through survey in order to determine relative abundance and general location of larval stages. An initial decision must then be made as to whether time, personnel, and wetland size allow for sampling the entire pond/wetland or just a portion of it. Our experience is that pond perimeters 400 feet or less require about two hours to sample. If the wetland site has over a 400 foot perimeter, we recommend subsampling the site using portions of the shoreline (see Step 5). Assuming the entire pond is to be sampled, the following procedure is used:

Step 1. First estimate the perimeter of the pond by attaching 12 foot lengths of plastic tape to vegetation around the edge approximately every 20 feet. The edge is considered the point where standing water meets the land at the time of sampling. A foot on each end of the tape is used to attached the tape to the vegetation so the end result is a perimeter with approximately every other 10 foot interval marked with tape. An estimate is made of the perimeter by using the 10 foot intervals. If two or more individuals are sampling, each person should make an estimate of the perimeter and the results averaged. The perimeter can be paced off or measured with a tape but given the additional use of the 10' plastic tapes and the difficulties of pacing or measuring such irregular distances, we opt for the former method. An outline of the pond and position of the tapes is sketched on paper approximately to scale so that the same areas can be sampled in subsequent years. If extrapolations are to be made to the entire pond, then area determinations should be made (see Step 4).

Step 2. Some shoreline habitat may not be used by larval stages and these non-suitable shoreline lengths are estimated using the 10 foot tape intervals. Examples of non-suitable habitat included steep banks which drop into the water, gravel or rocky shorelines, thick overhanging willows or alders creating dark shaded areas, and thick stands of cattails. The lengths of these areas are subtracted from the total perimeter to obtain the suitable shoreline perimeter.

Step 3. A minimum of 25% of the suitable shoreline habitat is sampled using 10 foot wide sections spaced randomly around the perimeter, i.e. if the suitable shoreline

perimeter is determined to be 200 feet, then a minimum of 5 10-foot sections are sampled. The 10 foot tapes are used to select the position and define the section width which runs along the shoreline. The section length of the section, i.e. how far it extends into the center of the pond is variable, depending upon water depth, bottom type and size of the pond. Ideally, the length should extend all the way out to water over 2 feet deep, or atleast up to 20 feet if possible. The length into the water times the 10 foot width gives the area covered for use in calculations of total larval populaton and density in the pond. Beginning in the deep end of the section and working toward the shoreline, a half-circle (180) sweep is made approximately every two feet (one step) using a 6 foot long dipnet with a 16 inch diameter net. The width of the sweep approximates the 10 foot wide section. In cases of heavy vegetation, the half circle sweep may have to consist of a series of smaller sweeps but they should be counted as a single sweep. The length of the section in feet is estimated by doubling the number of sweeps since one sweep is taken approximately every 2 feet. All tadpoles/larvae captured in a section are placed in a small bucket which can be attached to one's belt. When the entire section has been sampled, the larval stages are identified, counted and the first 30 individuals of each species measured with a ruler for total length (excluding individuals with broken tails or disfigured bodies). The length of the section, the species present, total number of each species, and the first 30 lengths of each species are recorded on the monitoring form (Appendix A). After processsing, tadpoles/larvae are released in approximately the center of the section from where they came. The sequence in which the sections are sampled is not considered critical but in order to minimize disturbance, no two adjacent sections should be sampled simultaneously.

Step 4. Surface area determinations are made of the entire pond, non-suitable habitat, and areas of deeper water if extrapolations are to be made from section densities to pond densities. Area determinations can be made by transcribing the distance of each side of the pond (viewed as a polygon) on an x-y grid paper using compass readings between the points. Using the grid coordinates for each of the points, the area is computed using the Mapmaker's formula (Jennrich and Turner, 1969). The areas can also be computed with a digitizer or compensating polar planimeter.

Step 5. If the wetland site is too large to sample in its entirety, i.e. usually over 400 foot perimeter, then only a portion of the shoreline need be sampled. Which portion to sample is a matter of field discretion, but larval presence and suitable habitat are the major guidelines. Once the shoreline portion has been chosen, the procedure is identical to Step 3, i.e. first estimate the length of the shoreline to be sampled using the 10 foot tape intervals, then exclude any non-suitable shoreline, and finally sample a minimum of 25% of the remaining suitable shoreline using 10 foot wide sections.

Calculations:

The calculations involve: 1) determining the mean density of larval stages in the sections; 2) making corrections for disturbance while sampling; 3) extrapolating to larger areas if necessary.

Step 1. Tadpole/larvae densities in the sampling sections are calculated by dividing the total number of tadpoles/larvae for each species by the surface area of the sections sampled. These densities are referred to as the SSHM densities.

Step 2. A person's presence in the sampling section and the dipnet action drives some tadpoles/larvae into the mud or out of the section before sampling is completed, thus SSHM densities determined by Step 1 need to be adjusted. The adjustment is made by multiplying the SSHM densities by a Density Correction Factor (DCF). The DCF is specific for each species density and can be read directly off the accompanying regression line (Figure D1) or computed from the linear equation: $Y = a + bX$ where a is the Y intercept (3.35), b is the slope (23.31) and X = any SSHM density. The resulting densities are called the adjusted SSHM densities.

Step 3. Extrapolation of data to the entire pond is done by multiplying the pond area, minus any deep water or non-suitable habitat by the adjusted SSHM density. If the objective of the sampling is to compare densities in the same (or similar areas) annually, extrapolating beyond the sampling sections is not necessary.

Computation of Density Correction Factor (DCF) :

Computing the DCF necessitated a comparison between densities derived by the SSH method and those derived simultaneously by another method such as mark-recapture or quadrat sampling. This comparison was done at 5 ponds on the Flathead Indian Reservation utilizing students from Salish Kootenai College under Dr. Werner's guidance. One salamander (*Ambystoma macrodactylum*) and three frog species (*Rana pretiosa*, *R. catesbeiana*, *Pseudacris regilla*) were present in the ponds.

For mark-recapture estimates (4 ponds), individuals were marked by punching the tail fin with a mouse ear punch or clipping the end of the tail. The initial marking session included all individuals caught during the SSHM sampling and during an immediate follow-up sampling of the entire pond using dipnets, seines and minnow traps. A second sampling (recapture effort) was repeated 2-24 hours after the first. Calculations followed Heyer et al. (1994). Quadrant sampling was done in a single pond where the tadpole density was too high for mark-recapture efforts. Five 1-meter square quadrants made of hardware cloth were placed randomly in the pond approximately 15 feet apart and sampled with a dipnet repeatedly until no new individuals were caught. The mean density from the five 1-meter quadrats was used to extrapolate to overall pond density.

The SSHM densities are given in Table B1. Population densities derived by mark-recapture/quadrat sampling are given in Table B2 and are considered closest to the true density. By dividing population densities by SSHM densities, we arrived at a figure called the Density Correction Factor (DCF; Table B3).

A plot of DCF's for all species against their corresponding SSHM densities (Figure B1) showed a positive correlation, i.e. the greater the density of tadpoles/larvae in the section, the greater the number of individuals driven into the mud or out of the

section and hence the higher the Correction Factor needed. This relationship was thus expressed as a regression of Density Correction Factor on SSHM density. The regression line is used to determine the adjusted densities in the sampling sections i.e. each SSHM density was multiplied by its corresponding DCF on the regression line (Step 2 of the above Calculations).

Limitations of the DCF and other aspects of the SSH method are discussed in the Discussion section.

Table B1. Density estimates based on the Suitable Shoreline Habitat Method (SSHM).

Site	Species*	# Sec. Sampled	Mean Section Area (ft ²)	Mean # Sweeps	Mean Tad/ Section	Density (Tad/ft ²)
K-13 Pond	R.p.	8	160	8	01.9	0.012
	A.m.	8	160	8	02.0	0.013
M-2 Pond	R.p.	5	150	8	14.8	0.098
	A.m.	5	150	8	24.8	0.165
Pistol Creek Marsh	R.p.	6	120	6	34.3	0.286
	A.m.	6	120	6	10.8	0.090
Lozeau Canyon Pond	R.p.	6	100	5	19.2	0.192
	A.m.	6	100	5	13.0	0.130
	P.r.	6	100	5	16.3	0.163
Camas Creek Pond	R.c.	4	100	5	07.0	0.088

* R.p. = *Rana pretiosa*; A. m. = *Ambystoma macrodactylum*; P.r. = *Pseudacris regilla*;
R.c. = *Rana catesbeiana*.

Table B2. Population densities based on mark-recapture or quadrat sampling.

Site	Species*	Area (ft ²)	Initial Marked	2nd Sample	# Recapture	# Quad.**	Mean # Tad/Quad.	Density (Tad/ft ²)
K-13 Pond	R.p.	7518	58	90	14			0.050
	A.m.	7518	36	49	5			0.047
M-2 Pond	R.p.	850	98	114	33			0.399
	A.m.	850	195	310	70			1.020
Pistol Creek Marsh	R.p.	2608				5	34.1	3.230
	A.m.	2608				5	4.1	0.388
Lozeau Canyon Pond	R.p.	481	115	355	83			1.023
	A.m.	481	78	157	25			1.020
	P.r.	481	98	239	36			1.350
Camas Creek Pond	R.c.	445	89	29	9			0.645

*R.p. = *Rana pretiosa*; A.m. = *Ambystoma macrodactylum*; P.r. = *Pseudacris regilla*;
R.c. = *Rana catesbeiana*.

** Mean quadrat size = 10.56 ft²

Table B3. Density estimates based on the Suitable Shoreline Habitat Method (SSHM).

Site	Species*	MR/Q Density	SSHM Density	DCF	Adj. SSHM Density
K-13 Pond	R.p.	0.050	0.012	04.17	0.050
	A.m.	0.047	0.013	03.62	0.047
M-2 Pond	R.p.	0.399	0.098	04.07	0.399
	A.m.	1.020	0.165	06.16	1.016
Pistol Creek Marsh	R.p.	3.230	0.286	11.29	3.229
	A.m.	0.390	0.090	04.31	0.388
Lozeau Canyon Pond	R.p.	1.023	0.192	05.33	1.023
	A.m.	1.020	0.130	07.85	1.021
	P.r.	1.350	0.163	08.28	1.350
Camas Creek Pond	R.c.	0.645	0.088	07.33	0.645

* R.p. = *Rana pretiosa*; A. m. = *Ambystoma macrodactylum*; P.r. = *Pseudacris regilla*;
R.c. = *Rana catesbeiana*.

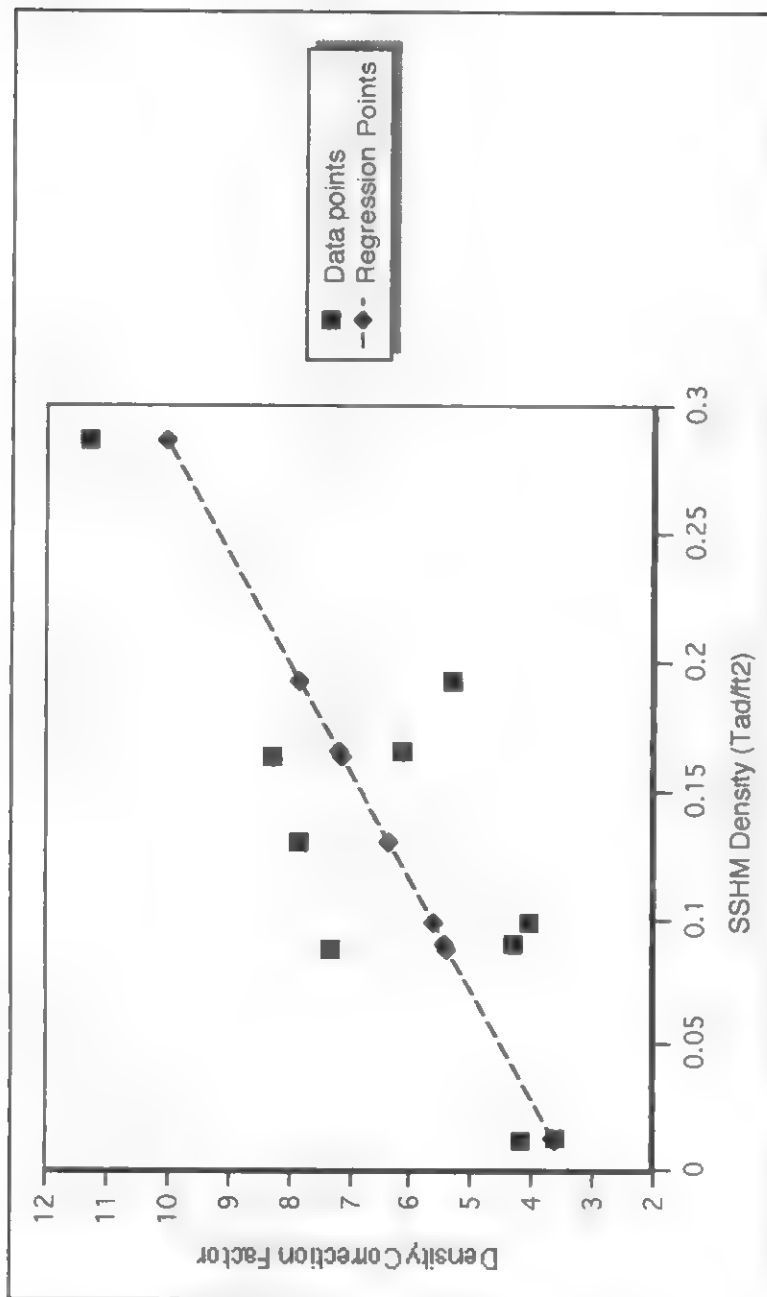


Figure B1. Regression of Density Correction Factors on SSHM densities. Data points are from Table D3. Regression output: Constant (Y intercept) = 3.35; Std. Error of Y Est. = 1.58; X Coefficient (Slope) = 23.31, Std. Error of Coef. = 6.36; R squared = 0.62.

Appendix C. Larvae/tadpole total lengths measured at each of the monitoring sites and several high altitude sites in the Kootenai National Forest, 1995.

Species:*	Cabinet District									
	Big Beaver Creek			Bull River		Cliff L.	Copp L.	Ulm Pk.	Willow Creek	
	A.m.	P.r.	R.p.	A.m.	P.r.	A.m.	A.m.	A.m.	A.m.	R.p.
	26	22	68	38	52	48	53	59	22	37
	26	15	64	51	37	54	54	62	20	42
	25	21	60	46	43	51	48	51	25	58
	20	24	53	55	41	46	51	49	22	30
	17	28	58	46	39	55	45	55	19	42
	23	27	62	21	29	52		53	31	36
	20	23	52	49	47	49		49	18	27
	27	19	58	35	32	53			27	22
	42		48		40				27	24
	36		61		36				21	28
	26		45		41				26	24
	33		47		44				21	35
	32		36		42				17	32
	26		52		32				18	36
	22		54		41				26	33
	26		52		44				23	41
	17		57		35				28	51
	20		53		32				23	53
	28		47		40				21	51
	26		43		39				24	44
	18		38		36				21	38
	30		47		39				26	26
	17		51		38				19	37
	31		35		45				17	34
	37		36		42					31
	17		42		41					33
	22		32		40					
	21		39		32					
	26		54		42					
	24		37		32					
N =	30	■	30	8	30	■	5	7	24	26
Sum =	761	179	1481	341	1173	408	251	378	542	945
Mean =	25.4	22.4	49.4	42.6	39.1	51	50.2	54	22.6	36.4
St. Dev. =	6.2	3.9	9.4	10.2	5.1	2.9	3.3	4.6	3.7	9.2
Max =	42	28	68	55	52	55	54	62	31	58
Min =	17	15	32	21	29	46	45	49	17	22

Appendix C. (con't)

Louis Lake		Fortine District Lost Lake Marsh		Powerline Pond		
A.m.	R.p.	A.m.	R.pi.	A.m.	P.r.	R.p.
41	56	49	33	19	22	68
44	68	43	41	31	26	55
39	59	36	31	30	17	56
26	49	36	43	30	22	
21	35	44	24	26	19	
34	61	48	40	31	21	
39	58	47	37	32	18	
35	57	39	36	24	21	
39	59	36		32	20	
37		51		33	14	
31		38		26	15	
37		43		36	13	
30		50		21	17	
32		44		36	22	
39		37		27	22	
33		37		27	21	
38		32		36	18	
32		32		32	21	
35		37		30	19	
38		39		32	21	
26		46		34	26	
45		49		34	16	
		33		30	24	
		42		27	12	
		37		26	15	
		33		28	21	
		39		29	23	
		38		23	22	
		49			21	
		46			32	
22	■	30	■	28	30	3
771	502	1230	285	822	601	179
35.1	55.8	41.0	35.6	29.4	20.0	59.7
5.8	8.7	5.8	5.8	4.3	4.1	5.9
45	■	51	43	36	32	68
21	35	32	24	19	12	55

Appendix C. (con't)

Blue Lake Marsh				Libby District			McKillop Rd. Pond			Silver Butte F. R.		
A.m.	P.r.	R.p.	B.b.	A.m.	R.p.	B.b.	A.m.	P.r.	R.p.	A.m.	P.r.	R.p.
45	41	70	33	23	47	22	55	40	55	19	14	62
36		79	24	20	40	17	32	35	58	20	10	49
38		84	29	17	38	16	44	43	61			40
31		65	30	19	50	21	33	42	62			43
31		79	23	15	43	21	27	40	65			45
45		75	23	17	39	18	42	45	68			47
38		71	21	21	41	20	39	36	44			35
34		81	26	17	32	21	34	25	60			57
26		83	30	19	36	21	45	42	70			36
30		71	26	16	32	18	38	28	82			44
40		55	29		38	24	34	43	63			40
39		76	18		48	17	31	17	74			44
21		67	25		37	24	50	35	79			39
30		78	23		24	21	53	48	70			45
33		69	20		36	21	47	40	68			47
37		76	25		39	23	52	40	71			43
34		79	24		27	22	44	41	62			37
28		60	29		27	18	40	40	81			39
37		78	21		30	18	29	33	76			33
36		81	21		32	22	40	34				29
45		50	26		28	19	39	41				39
35			25		39	24	32	44				30
24			31		46	18	32	44				54
			29		47	22	37	32				42
					32	22	33	35				47
					57	23	35	39				50
					43	21	35	35				52
					47	19	30	25				35
					34	18	40	36				37
					41	21	33	40				39
23	1	21	24	10	30	30	30	30	19	2	2	30
793	41	1527	611	184	1150	612	1155	1118	1269	39	24	1279
34.5	41	72.7	25.5	18.4	38.3	20.4	39.0	37.3	66.8	19.5	12	42.6
6.3	0.0	9.0	3.8	2.3	7.7	2.2	7.4	6.7	9.3	0.5	2.0	7.5
45	41	84	33	23	57	24	55	48	82	20	14	62
21	41	50	18	15	24	16	27	17	44	19	10	29

Appendix C. (con't)

Boulder Lk. A.m.	Rexford District Dodge Creek Pond			Horse Lakes		
	A.m.	P.r.	R.p.	A.m.	R.p.	B.b.
41	39	37	52	43	55	36
43	29		60	33	62	35
42	41		45	22	68	32
48	41		43	32	76	36
	25		41	30	72	32
	40		61	26	47	29
	37		34	29	68	32
	32			42	73	30
	24			34	82	26
	44			46	63	37
				29	46	19
				15	63	32
				27	73	34
				31	64	37
				48	79	34
				46	48	32
				46	69	30
				34	62	32
				50	42	30
					67	25
					68	26
					73	26
					64	22
					58	24
					68	23
					71	33
					56	34
					55	36
					43	32
					43	28
4	10	1	7	19	30	30
174	352	37	336	663	1878	914
43.5	35.2	37	48	34.9	62.6	30.5
2.7	6.8	0.0	9.3	9.5	11.0	4.7
48	44	37	61	50	82	37
41	24	37	34	15	42	19

*A.m = *Ambystoma macrodactylum*; P.r. = *Pseudacris regilla*;
R.p. = *Rana pretiosa*; B.b. = *Bufo boreas*.

Three Rivers District											
Bad Med. CC Pond			Keeler Creek Pond			Pete Creek Meadows				Vinal Rd. Pond	
A.m.	P.r.	R.p.	A.m.	P.r.	R.p.	A.m.	P.r.	R.p.	B.b.	A.m.	P.r.
33	28	53	28	12	52	21	25	52	20	43	53
35	26	45	27	16	58	25	22	47	22	42	48
36	32	47	28	12	44	16	21	52		29	51
39	34	53	36	18	47	25	30	53		40	46
35	31	62	28	16	41	20	19	50		21	48
40	28	48	34	21	35	16	20	40		43	44
33	32	55	23	14	47	23	36	41		47	42
27	30		39	13	39	18	22	51		26	42
33	28		31	16	42	19	26	50		42	49
29	28		33	17	28	24	27	60		51	39
29	26		23	13	26	19	19	56		39	46
33	24		40	12	34	15	13	56		25	15
33	28		26	19	35	19	19	56		36	52
26	28		27	20	35	21	13	53		51	47
33	31		24	14	40	23	13	52		69	36
26	34		25	16	36	28	18	51		49	47
29	34		24	18	41	16	20	59		25	47
26	30		23	18	40	25	10	56		42	45
28	31		25	22	35	21	23	52		38	48
27	27		22	19	32	20	22	49		35	38
26	34		23	19	37	29	17	37		36	29
39	26		25	17	37		22	33		29	47
34	19		30	22	32		16	54		26	51
29	21		18	25	35		29	59		45	51
32	27		21	15			22	51		34	60
27	26		22	15			30	49		20	51
16	33		24	20			16	66			43
34	25		26	16			18	58			51
36	34		25	24			28	47			49
35	30		25	18			19	45			46
30	30	7	30	30	24	21	30	30	2	26	30
938	865	363	805	517	928	443	635	1535	42	983	1361
31.27	28.83	51.86	26.83	17.23	38.67	21.1	21.17	51.17	21	37.81	45.37
4.99	3.78	5.36	5.12	3.41	7.10	3.85	5.77	6.89	1.00	10.89	8.04
40	34	62	40	25	58	29	36	66	22	69	60
16	19	45	18	12	26	15	10	33	20	20	15

Appendix D. Individual egg volume displacement (VD) data for *Rana pretiosa* and *Rana pipiens* in the Kootenai National Forest. Eggs were classified as either Type I - <72 hrs old or Type II - > 72 hrs old based on their size, compactness and development.

District	Site	Date	Species*	Type I		Type II	
				# Eggs	VD(mm)	# Eggs	VD(mm)
Cabinet	Big Eddy Rec. Area	04/02	R. p.			28	22
						26	23
						29	18
						33	26
						26	24
						49	30
						23	20
						25	21
						30	26
						22	21
						291	231
	Bull River Oxbow	04/03	R. p.	40	20	32	9
				32	14	30	■
				33	12	35	13
				33	15	41	11
				31	15	28	8
				25	10	39	13
				21	10	24	■
				30	17	32	13
				31	15	29	10
				31	14	37	10
				29	14	327	104
				23	13		
				21	14		
				31	15		
				22	14		
				35	15		
				24	12		
				28	12		
				29	12		
				30	12		
				579	275		
Fortine	Lost Lake Marsh	04/29	R. pi.	24	8		
				23	■		
				24	11		
				28	■		
				32	11		
				26	7		
				29	14		
				27	10		
				18	4		

Appendix D. Individual egg volume displacement (VD) data for *Rana pretiosa* and *Rana pipiens* in the Kootenai National Forest. Eggs were classified as either Type I - <72 hrs old or Type II - > 72 hrs old based on their size, compactness and development.

District	Site	Date	Species*	Type I		Type II	
				# Eggs	VD(mm)	# Eggs	VD(mm)
				27	9		
				258	91		
Three Riv.	Vinal Road Pond	04/28	R. p.	34	16	32	17
				28	17	29	22
				31	15	32	23
				30	18	30	24
				24	13	30	22
				28	13	38	27
				33	19	27	24
				30	18	30	27
				25	15	34	25
				42	20	28	22
				305	164	310	233
Totals:	(<i>R. pretiosa</i>)						
Sums =		884	439	928	568		
Means =			0.497		0.612		
Totals:	(<i>R. pipiens</i>)						
Sums =		258	91				
Means =			0.353				

*R.p. = *Rana pretiosa*; R.pi. = *Rana pipiens*.

Appendix E Individual egg volume displacement (VD) data for *Rana pretiosa* on the Flathead Reservation. Eggs were classified as either Type I = <72 hrs old or Type II = 72 hrs old based on their size, compactness and development.

Division	Site	Date	Species*	Type I		Type II	
				# Eggs	VD(cc)	# Eggs	VD(cc)
L. Bitterroot	Lozeau Canyon	04/22	R. p.	31	13	21	16
				39	20	30	19
				23	13	25	16
				19	7	26	15
				31	11	26	17
				19	7	31	17
				25	9	22	16
				29	10	25	15
				17	10	29	21
				26	9	31	26
				259	109	266	178
Mission Val.	M.C. No. Pond 2	04/12	R. p.	29	13	24	17
				29	12	28	19
				26	10	24	22
				32	11	24	21
				26	■	22	22
				42	20	30	21
				23	0	32	27
				43	13	26	21
				34	11	25	20
				32	9	28	24
				316	117	263	214
	M.C. So. Pond K8	04/07	R. p.	23	6	25	15
				33	8	38	21
				32	8	22	9
				36	8	37	19
				32	9	32	18
				33	8	29	20
				40	10	30	18
				28	7	31	16
				33	9	32	15
				31	8	29	14
				321	81	305	165
L. Flat. Riv.	Toolman Marsh	04/22	R. p.	39	16		
				23	9		
				27	11		
				26	11		
				30	14		
				25	9		
				41	14		

Appendix E. Individual egg volume displacement (VD) data for *Rana pretiosa* on the Flathead Reservation. Eggs were classified as either Type I = <72 hrs old or Type II - 72 hrs old based on their size, compactness and development.

Division	Site	Date	Species*	Type I		Type II	
				# Eggs	VD(cc)	# Eggs	VD(cc)
				22	10		
				32	12		
				21	10		
				286	116		
Jocko Drain.	Diversion Pond	05/02	R. p.			23	19
						26	21
						30	20
						30	26
						30	24
						23	17
						31	27
						30	28
						39	33
						26	18
						288	233
Totals:							
Sums =				1182	423	1122	790
Means =					0.36		0.70

* R. p. = *Rana pretiosa*.

Appendix F. Site surveyed or monitored for amphibians and reptiles in the Kootenai National Forest during 1995.

Site	Survey/ Monit	Location	Elevation	Date	Start Time
Cabinet District					
Big Beaver Creek Beaver Ponds	M	T22N R31W S4 NW4	2660	06/29/95	1515
Big Eddy Recreation Area	S	T27N R34W S25 SW4SW4	2251	04/20/95	1045
Bull River Oxbow Pond	S	T27N R33W S4 SE4SW4	2309	04/03/95	1045
Bull River Oxbow Pond	M	T27N R33W S4 SE4SW4	2309	06/14/95	0845
Clark Fork Backwater by Noxon	S	T26N R32W S19 NW4	3350	07/15/95	1220
Clark Fork Backwater by Noxon	S	T26N R32W S19 NW4	2250	06/02/95	1645
Clark Fork Oxbows on Hwy 200	S	T26N R33W S13 SW4	2194	06/02/95	1830
Clark Fork Oxbows on Hwy 200	S	T26N R33W S13 SW4	2194	07/15/95	1430
Cliff Lake	S	T27N R32W S26 NE4NE4	6480	07/17/95	1115
Copper Lake	S	T27N R32W S23 SE4SW4	6350	07/17/95	1345
Ulm Peak North Pond	S	T25N R34W S22 NW4SE4	5650	07/16/95	1235
Ulm Peak South Pond	S	T25N R34W S22 NW4SE4	5650	07/16/95	1430
Willow Creek Pond	M	T25N R29W S36 NW4NW4	3710	06/29/95	1200
Fortine District					
Alkali Lake	S	T36N R27W S35 S2	2982	07/28/95	1320
Bluebird Lake*	S	T37N R26W S26 NE4	6880	08/26/95	1230
Costich Lake	S	T36N R26/27W S13/18	2810	07/08/95	1300
Dickey Lake	S	T34N R25W S16 E2	3108	06/16/95	1530
DeRozier Creek Reservoir*	S	T37N R26W S8 SW4NW4	3790	07/30/95	1350
Frank Lake	S	T35N R26W S7/18	3138	07/31/95	2130
FS Rd 688, Pond on W. side*	S	T36N R27W S36 NW4SW4	2970	07/28/95	1110
Indian Creek*	S	T37N R26W S29 NE4	3250	07/30/95	1145
Lost Lake*	S	T35N R26W S6 SW4	2916	08/02/95	1400
Lost Lake Marsh	S	T35N R26W S6 NE4SW4	2910	04/29/95	1635
Lost Lake Marsh	M	T35N R26W S6 NE4SW4	2190	06/25/95	1205
Lost Lake Marsh	S	T35N R26W S6 NE4SW4	2190	08/02/95	1300
Louis Lake	M	T33N R25W S15 N2	4920	07/05/95	1200
Louis Lake, Pond North of	S	T33N R25W S15 NE4NW4	4910	05/10/95	1130

Appendix F. Site surveyed or monitored for amphibians and reptiles in the Kootenai National Forest during 1995.

Site	Survey/ Monit	Location	Elevation	Date	Start Time
Paradise Lake*	S	T37N R2W S25 NW4	6710	08/26/95	1110
Paul Creek Beaver Pond	S	T33N R25W S27 NE4NE4	4380	07/05/95	1010
Powerline Pond	S	T33N R24W S6 SE4SW4	3260	04/30/95	1230
Powerline Pond	M	T33N R24W S SE4SW4	3260	06/16/95	0910
Rock Lake	S	T35N R26W S	2910	08/02/95	1145
Sunday Lake Pond, Lower	S	T33N R24W S6 SW4SE4	3200	04/30/95	1115
Trego Pond along FS Rd 36	S	T34N R25W S19 SW4NE4	3170	07/05/95	1545
Libby District					
Blue Creek Headwaters Marsh	M	T32N R30W S16 SE4	3870	07/06/95	1345
Blue Creek Road, Pond N. of	S	T32N R30W S23 NE4NW4	2850	04/27/95	1630
Elk Creek, Upper Region	S	T26N R28W S25/36	3800	07/23/95	1130
Flower Lake	S	T30N R32W S24 N2	3030	05/31/95	1015
FS Rd 4792 South Pond	S	T2N R31W S11 NW4SW4	2590	07/20/95	1310
FS Rd 4792 North Pond*	S	T2N R31W S11 SW4NW4	2570	07/20/95	1505
Granite Creek overflow by Libby	S	T30N R31W S23 NE4NW4	2205	05/31/95	1200
LaFoe Lake	S	T33N R32W S13 SW4	3820	08/01/95	1535
LaFoe Lake	M	T33N R32W S13 SW4	3820	07/06/95	1330
Libby Wastewater Treat. Pond	S	T31N R31W S33 SE4SE4	2065	08/02/95	1130
McKillop Road Pond	S	T27N R28W S6 NW4NW4	3030	04/10/95	1330
McKillop Road Pond	M	T27N R28W S6 NW4NW4	3030	06/22/95	1400
Pipe Creek, E. Fork Headwaters	S	T34N R30W S31 W2	4240	06/01/95	1345
Silver Butte Fisher R. Oxbow	S	T26N R28W S19 NE4SW4	4240	04/11/95	1730
Silver Butte Fisher R. Oxbow	M	T26N R29W S19 NE4SW4	4240	08/22/95	1015
Wolf Creek Headwaters Pond	S	T31N R27W S1 SE4NE4	3600	04/30/95	1500
Rexford District					
Amish Colony Pond	S	T37N R28W S15 SE4NE4	2720	07/29/95	1605
Arnold's Pond	S	T36N R28W S4 NW4NW4	2930	04/29/95	1050
Maney Lake	S	T37N R27W S20 SW4SE4	2420	07/08/95	1030

Appendix F. Site surveyed or monitored for amphibians and reptiles in the Kootenai National Forest during 1995.

Site	Survey/ Monit	Location	Elevation	Date	Start Time
Black Lake	S	T36N R27W S16 SW4	2747	06/15/95	1805
Boulder Lake, Lower	S	T36N R30W S35 SE4SW4	6070	08/01/95	1030
Boulder Lake, Upper	S	T35N R30W S2 SE4NW4	6250	08/01/95	1245
Dancing Prairie Nat. Con. Area*	S	T37N R27W S26	2671	07/30/95	1610
Dodge Creek Duck Pond	M	T37N R28W S26 S2	2600	06/26/95	1105
Drop Creek Headwaters Pond	S	T34N R31W S12 SE4NW4	4028	07/07/95	1210
Grob Lake and Ponds	S	T37N R27W S32/29	2506	07/31/95	1015
Horse Lakes	S	T34N R30W S31 NW4	4240	06/01/95	1230
Horse Lakes	M	T34N R30W S31 NW4	4240	07/07/95	0930
Lake Kocanusa, Seeps on W. side	S	T33/34N R28/29W	2700	05/10/95	1900
Pinkham Creek Cpgd. Area*	S	T36N R28W S35 SW4	2710	08/01/95	1630
Sutton (Falls) Creek Falls*	S	T35N R28W S30 SW4NE4	3390	07/29/95	1030
Tepee Lake*	S	T35N R27W S21 NE4NW4	4400	04/29/95	1440
Tooley Lake	S	T37N R28W S23 E2	2537	07/29/95	1730
Tweed Creek*	S	T34N R29W S26 SE4	3200	07/29/95	1310
Three Rivers District					
Bad Medicine Cpgd. Pond S. of	S	T28N R33W S4 SE4NW4	2350	04/27/95	1000
Bad Medicine Cpgd. Pond S. of	M	T28N R33W S4 SE4NW4	2350	06/15/95	0930
Hawkins Pond*	S	T37N R33W S18 NE4	6180	06/30/95	1445
Keeler Creek Pond	S	T30N R34W S29 SW4NE4	2980	05/12/95	1005
Keeler Creek Pond	M	T30N R34W S29 SW4NE4	2980	06/15/95	1315
Keeler Creek, South Fork*	S	T29N R34W S4 SW4SW4	4200	07/21/95	1805
O'Brien Creek	S	T31N R33W S17 NE4NW4	2010	06/01/95	1920
Pete Creek Meadows	S	T37N R33W S24 NW4	4290	05/21/95	1015
Pete Creek Meadows	M	T37N R33W S24 NW4	4290	06/30/95	1300
Spar Lake	S	T29N R34W S21 NW4NW4	3294	06/15/95	1210
Spruce Lake Pond	S	T29N R34W S8 NW4	4090	07/21/95	1310
Spruce Lake	S	T29N R34W S7/8 NW4	4110	07/21/95	1515
Vinal Lake	S	T36N R31W S30 SE4	2940	05/20/95	1430

Appendix F. Site surveyed or monitored for amphibians and reptiles in the Kootenai National Forest during 1995.

Site	Survey/ Monit	Location	Elevation	Date	Start Time
Vinal Lake Road Pond	S	T35N R32W S12 SE4	3355	04/28/95	1430
Vinal Lake Road Pond	M	T35N R32W S12 SE4	3355	06/30/95	1000
Yaak R. backwater by Baldy Crk. *	S	T35N R33W S8	2830	05/20/95	1350
Yaak R. Whitetail Cpgrd. Pond	S	T35N R33W S2 SE4NE4	2903	04/15/95	1500

* Sites with no herps found during survey.

Appendix G. Amphibians and reptiles observed during surveys or monitoring of the Kootenai National Forest during 1995.

Site	Hrs:min	Total number of adults/juveniles of each species observed ¹									
		AMMA	AMTI	PLID	BUBO	PSRE	RAPR	RAPI	CHPI	THSI	THEL
Cabinet District											
Big Beaver Creek Beaver Ponds	3:30	*					13*				
Big Eddy Recreation Area	3:00					30	4*				
Bull River Oxbow Pond	2:30					50	2*				
Bull River Oxbow Pond	7:45	*				*					
Clark Fork Backwater by Noxon	1:15	*							1		
Clark Fork Backwater by Noxon	1:10					*			2		
Clark Fork Oxbows on Hwy 200	1:00	*									
Clark Fork Oxbows on Hwy 200	1:15								1		1
Cliff Lake	1:45	*									
Copper Lake	1:25	*									
Ulm Peak North Pond	1:15	*									
Ulm Peak South Pond	1:30	*					38*				
Willow Creek Pond	3:20	*					9*				
Fortine District											
Alkali Lake	2:10								3		1
Costich Lake	2:10								3		
Dickey Lake	1:20	*					1*				
Frank Lake	3:00		*						35		
Lost Lake Marsh	1:10	3						*			
Lost Lake Marsh	3:15	*						5*	2	1	1
Lost Lake Marsh	0:45	*						2			2
Louis Lake	3:45	*					1*				
Louis Lake, Pond North of	1:10	*									
Paul Creek Beaver Ponds	0:50	*					*				
Powerline Pond	1:10	*				*					
Powerline Pond	8:30	*					1*				
Rock Lake	0:45								2		
Sunday Lake Pond, Lower	0:55						1				

Appendix G. Amphibians and reptiles observed during survey or monitoring of the Kootenai National Forest during 1995.

Site	Hrs:min	Total number of adults/juveniles of each species observed ¹									
		AMMA	AMTI	PLID	BUBO	PSRE	RAPR	RAPI	CHPI	THSI	THEL
Treg Pond along FS Rd 36	1:00				*		8*				
Libby District											
Blue Creek Headwaters Marsh	4:45	*			1*	*	9*				
Blue Creek Road, Pond N. of	1:00	*					*				
Elk Creek, Upper Region	3:15										6
Flower Lake	1:15	*			*		10*				
FS Rd 4792 South Pond	1:10	*					4			1	
Granite Creek overflow by Libby	1:10						3		2	1	
LaFoe Lake	0:55	*			*		16*			1	
LaFoe Lake	4:30	*			*		3*				
Libby Wastewater Treat. Pond	0:55	*							9		
McKillop Road Pond	2:10	*				20					
McKillop Road Pond	11:30	*				*					
Pipe Creek, E. Fork Headwaters	0:45	*			*		1*				
Silver Butte Fisher R. Oxbow	1:30					1	*				
Silver Butte Fisher R. Oxbow	11:00	*				*					
Wolf Creek Headwaters Pond	1:30						*				
Rexford District											
Amish Colony Pond	0:55				2*						
Arnold's Pond	1:25	1				3					1
Banay Lake	1:15								2		
Black Lake	1:25								4		
Boulder Lake, Lower	1:00	*									
Boulder Lake, Upper	0:55	*									
Dodge Creek Duck Pond	3:50	*				*					
Drop Creek Headwaters Pond	0:30	*									
Grob Lake and Ponds	2:30								75		

Appendix G. Amphibian and reptiles observed during surveys or monitoring of the Kootenai National Forest during 1995.

Site	Hrs:min	Total number of adults/juveniles of each species observed ¹									
		AMMA	AMTI	PLID	BUBO	PSRE	RAPR	RAPI	CHPI	THSI	THEL
Horse Lakes	0:45	*			1*		5*				
Horse Lakes	4:00	*			*		3*				
Lake Koocanusa, Seeps on W. side	1:30			4							
Tooley Lake	1:00									1	
Three Rivers District											
Bad Medicine Cpgrd. Pond S. of	1:00	1				4					
Bad Medicine Cpgrd. Pond S. of	7:00	*				*	*				
Keeler Creek Pond	1:30				*	5					
Keeler Creek Pond	7:40	*				1*	9*				
O'Brien Creek	1:40				1						
Pete Creek Meadows	1:00					12					
Pete Creek Meadows	11:15	*			*	*	*				
Spar Lake	0:30				3*						
Spruce Lake Pond	1:20	*					*				
Spruce Lake	1:20	*									
Vinal Lake	0:45				*		1				1
Vinal Lake Road Pond	1:15	*				6	*				
Vinal Lake Road Pond	7:30	*				*	2*				
Yaak R. Whitetail Cpgrd. Pond	0:45						*				

¹ AMMA = *Ambystoma macrodactylum*; AMTI = *Ambystoma tigrinum*; PLID = *Plethodon idahoensis*; BUBO = *Bufo boreas*;

PSRE = *Pseudacris regilla*; RAPR = *Rana pretiosa*; RAPI = *Rana pipiens*; CHPI = *Chrysemys picta*;

THSI = *Thamnophis sirtalis*; THEL = *Thamnophis elegans*.

* denotes site with breeding, i.e. eggs, larvae, tadpoles or newly metamorphosed young.

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LONG-TOED SALAMANDER

Flathead	< .5 mile.	4/30/1995	Yes	Observation
Powerline Pond, near lower Sunday Lake				

Flathead	< .5 mile.	7/ 5/1995	Yes	Observation
Paul Creek beaver ponds				

Flathead	< .5 mile.	7/19/1995	Yes	Observation
End of FS RD 9602A				

Flathead	< .5 mile.	7/19/1995	Yes	Observation
30 m before jct of FS RD 9602 and 9602A (near Griffin Creek)				

Flathead	< .5 mile.	7/19/1995	Yes	Observation
Mouth of Ingalls Creek				

Flathead	< .5 mile.	7/25/1995	Yes	Observation
Reach #14 H-358 G-35 in main channel of Griffin Creek				

Lincoln	< .5 mile.	4/29/1995	No	Observation
Lost Lake Marsh (between Lost and Rock Lakes)				

Lincoln	< .5 mile.	4/27/1995	Yes	Observation
Blue Creek Road (FS RD 615) pond, ca. 1 mi. E. of FS RD 68				

Lincoln	< .5 mile.	4/27/1995	Yes	Observation
Bad Medicine Campground Pond				

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LONG-TOED SALAMANDER (cont.)

Lincoln	< .5 mile.	4/10/1995	Yes	Observation McKillop Creek Road (FS RD 535) pond A
Lincoln	< .5 mile.	4/29/1995	No	Observation Arnold's Pond
Lincoln	< .5 mile.	4/28/1995	Yes	Observation Vinal Lake road pond B
Lincoln	.5 to 5 mil	6/27/1962	No	Museum Specimen Pinkham Mountain Road near Jct. with Fivemile Cr. Rd.
Lincoln	.5 to 5 mil	8/ 5/1962	No	Museum Specimen 4.5 mi. (rd.) SSW U.S. 2; NW slope Hoodoo Mtn.; Cherry Cr. drainage.
Lincoln	< .5 mile.	6/ 2/1995	Yes	Observation Ponds near Libby wastewater treatment plant.
Lincoln	< .5 mile.	6/ 1/1995	Yes	Observation LaFoe Lake (marsh)
Lincoln	< .5 mile.	6/ 1/1995	Yes	Observation Bog at headwaters of unnamed branch (east) of E Fk Pipe Cr Adj to FS RD 753
Lincoln	< .5 mile.	6/ 1/1995	Yes	Observation Horse Lakes
Lincoln	< .5 mile.	5/31/1995	Yes	Observation Flower Lake
Lincoln	< .5 mile.	6/16/1995	Yes	Observation Dickey Lake
Lincoln	< .5 mile.	6/22/1995	Yes	Observation Silver Butte Fisher River Oxbow

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LONG-TOED SALAMANDER (continued)

Lincoln	< .5 mile.	6/14/1995	No	Observation
Bull River backwater pond along HWY 56				

Lincoln	< .5 mile.	6/30/1995	Yes	Observation
Pete Creek Meadows Pond.				

Lincoln	< .5 mile.	6/15/1995	Yes	Observation
Keeler Creek Ponds				

Lincoln	< .5 mile.	5/10/1995	Yes	Observation
Louis Lake Ponds				

Lincoln	< .5 mile.	7/ 6/1995	Yes	Observation
Blue Creek Headwaters Marsh				

Lincoln	< .5 mile.	7/ 7/1995	Yes	Observation
Drop Creek; headwaters pond.				

Lincoln	< .5 mile.	8/ 2/1995	Yes	Observation
Lost Lake Ponds				

Lincoln	< .5 mile.	8/ 1/1995	Yes	Observation
Upper Boulder Lake				

Lincoln	< .5 mile.	8/ 1/1995	Yes	Observation
Lower Boulder Lake				

Lincoln	< .5 mile.	7/20/1995	Yes	Observation
South pond off FS RD 4792				

Lincoln	< .5 mile.	7/21/1995	Yes	Observation
Pond 0.25 mi. E. of Spruce Lake				

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LONG-TOED SALAMANDER (continued)

Lincoln	< .5 mile.	7/16/1995	Yes	Observation Teepee Lake
Lincoln	< .5 mile.	8/24/1995	Yes	Observation Horse Lakes
Sanders	.5 to 5 mil	7/ 3/1986	No	Museum Specimen 6 mi. NE of Thompson Falls
Sanders	.5 to 5 mil	11/ 2/1951	No	Museum Specimen 8 mi. W. of Noxon
Sanders	.5 to 5 mil	4/ 2/1952	No	Museum Specimen Noxon, schoolhouse
Sanders	.5 to 5 mil	/ /1952	No	Museum Specimen Thompson Falls
Sanders	.5 to 5 mil	7/ 7/1962	No	Museum Specimen Mosquito Creek; 1.5 mi. (rd.) SW of Clarks Fork
Sanders	< .5 mile.	6/ 2/1995	Yes	Observation Clark Fork backwater on N. side HWY 200 across river from Noxon
Sanders	< .5 mile.	6/ 2/1995	No	Observation Old oxbows on Clark's Fork, N. of HWY 200, ca. 2 mi. N. of Noxon
Sanders	< .5 mile.	6/29/1995	Yes	Observation Willow Creek Ponds--Pond D
Sanders	< .5 mile.	6/29/1995	Yes	Observation Big Beaver Creek Beaver Ponds

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LONG-TOED SALAMANDER (continued)

Sanders	< .5 mile.	7/16/1995	Yes	Observation
Ulm Peak ponds				

Sanders	< .5 mile.	7/17/1995	Yes	Observation
Cliff Lake				

Sanders	< .5 mile.	7/17/1995	Yes	Observation
Copper Lake				

Sanders	< .5 mile.	7/22/1995	Yes	Observation
Fishtrap Lake, Radio Creek outlet.				

TIGER SALAMANDER

Lincoln	< .5 mile.	7/31/1995	Yes	Observation
Frank Lake				

COEUR D'ALENE SALAMANDER

Lincoln	< .5 mile.	8/13/1980	No	Museum Specimen
Kootenai Falls				

Lincoln	.5 to 5 mil	8/10/1965	No	Museum Specimen
At mine shaft on Montana side of state line at Leonia, ID				

Lincoln	.5 to 5 mil	7/ 4/1964	No	Museum Specimen
Cliffs above Spar Creek where trail to Little Spar Lake leaves Rd.				

Lincoln	.5 to 5 mil	7/ 2/1964	No	Museum Specimen
Near base of Payne Creek. Falls; ca. 1 mi. E. of Bull Lake				

Lincoln	.5 to 5 mil	7/ 7/1963	No	Museum Specimen
5.5 mi. SW (rd.) of Troy				

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COEUR D'ALENE SALAMANDER (cont.)

Lincoln	5 to 10 mil	5/10/1995	No	Observation
Seeps on W. side of Lake Koocanusa.				

Lincoln	< .5 mile.	/ /1962	No	Observation
NW face of Big Hoodoo Mtn., S from Libby				

Lincoln	.5 to 5 mil	/ /1962	No	Observation
Kootenai Falls area; 5.7 mi E of Lake Cr Br (Troy)				

Lincoln	< .5 mile.	6/ 1/1987	No	Observation
W. bank of Yaak R., 60 m downstream from falls.				

Lincoln	< .5 mile.	5/19/1987	No	Observation
Surprise Gulch, ca. 6.5 rd. mi. E of Troy				

Lincoln	< .5 mile.	5/31/1987	No	Observation
S side of FS Rd 4402, ca. 3 mi. NW of Troy				

Lincoln	< .5 mile.	/ /1987	No	Observation
Under Ziegler Mountain				

Lincoln	.5 to 5 mil	6/ 8/1987	No	Observation
Mid-Koocanusa.				

Lincoln	< .5 mile.	6/ 3/1987	No	Observation
Under Scenery Mtn, 11.5 mi E of Lake Cr Br. (Troy)				

Lincoln	< .5 mile.	/ /1988	No	Observation
Koocanusa 4a, 4b				

Lincoln	< .5 mile.	/ /1988	No	Observation
Pipe Creek, 18 miles NNW of Libby				

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COEUR D'ALENE SALAMANDER (cont.)

Lincoln	< .5 mile.	5/ 8/1988	No	Observation
Koot Creek, 8 mi. east of Troy				
Lincoln	< .5 mile.	7/15/1993	No	Observation
Quartz Creek, ca. 4 mi. NW of Libby				
Lincoln	.5 to 5 mil	5/30/1993	No	Specimen Reported
Little N Fk Big Cr, 1 mi W of W-side HWY-Lk Koocanusa				
Lincoln	< .5 mile.	5/17/1994	No	Museum Specimen
West bank Lake Koocanusa				
Lincoln	.5 to 5 mil	8/ 9/1990	No	Observation
S Fk. Yaak R., just up from the town of Yaak.				
Sanders	.5 to 5 mil	/ /1986	No	Observation
Thompson River/Barktable				
Sanders	< .5 mile.	5/21/1987	No	Observation
Priscilla Peak, east of Thompson Falls.				
Sanders	< .5 mile.	6/ 5/1987	No	Observation
N. side FS Rd. 152, NW of Thompson Falls.				
Sanders	< .5 mile.	5/21/1987	No	Observation
Cougar Gulch, NW of Thompson Falls.				
Sanders	< .5 mile.	5/21/1987	No	Observation
Sims Creek				
Sanders	< .5 mile.	/ /1987	No	Observation
Heron-Noxon Rd., 1.9 mi. W of junct. w/FS Rd. 149				

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COEUR D'ALENE SALAMANDER (cont.)

Sanders	< .5 mile.	6/ 6/1988	No	Observation
Cougar Mine, ca. 9 mi. NNW of Thompson Falls.				

Sanders	< .5 mile.	/ /1988	No	Observation
White Pine Creek; 15 mi. WNW of Thompson Falls.				

Sanders	< .5 mile.	5/ 4/1994	No	Museum Specimen
Devil's Gap area, NW of Trout				

TAILED FROG

Flathead	5 to 10 mil	7/26/1958	Yes	Museum Specimen
Graves Creek				

Lincoln	.5 to 5 mil	5/30/1993	No	Museum Specimen
Little North Fork of Big Creek, 2900 ft.				

Lincoln	.5 to 5 mil	6/14/1949	No	Museum Specimen
Libby, Leigh Creek, 3600 ft				

Lincoln	.5 to 5 mil	7/17/1951	No	Museum Specimen
Troy, main fork of Keeler Creek, 5600 ft.				

Lincoln	.5 to 5 mil	8/17/1962	No	Museum Specimen
In culvert under Bear Creek Road; NW slope of Hoodoo Mountain; Kootenai NF				

Lincoln	.5 to 5 mil	8/ 3/1962	No	Museum Specimen
Jill Creek at N. Callahan Creek Trail.				

Sanders	< .5 mile.	9/27/1991	Yes	Museum Specimen
Rock Creek.				

Sanders	.5 to 5 mil	/ /1986	No	Museum Specimen
Liver Gulch, lower Thompson River				

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TAILED FROG (cont.)				
Sanders	.5 to 5 mil	7/ 4/1991	Yes	Museum Specimen
Small stream near Thompson Pass				
Sanders	.5 to 5 mil	7/28/1958	Yes	Museum Specimen
Big Rock Creek				
Sanders	< .5 mile.	8/24/1994	No	Observation
Dixie Creek, E. aspect, 4040 ft. 1 mi. up creek.				
Sanders	< .5 mile.	8/23/1994	No	Observation
Upper Beaver, E. aspect, 4200 ft.				
Sanders	< .5 mile.	8/11/1994	Yes	Observation
South Branch Beaver Creek, NE aspect, 4500 ft.				
Sanders	< .5 mile.	9/ 8/1993	Yes	Observation
Lost Branch Beaver Creek, 4560 ft.				
Sanders	< .5 mile.	9/ 8/1993	Yes	Observation
Lost Branch Beaver Creek, 4520 ft.				
Sanders	< .5 mile.	9/ 8/1993	Yes	Observation
Lost Branch Beaver Creek, 4130 ft.				
Sanders	< .5 mile.	8/24/1993	No	Observation
Upper Little Beaver Creek				
Sanders	< .5 mile.	8/23/1993	Yes	Observation
Upper Beaver Creek				
Sanders	< .5 mile.	9/14/1993	No	Observation
Green Gulch				

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TAILED FROG (cont.)

Sanders	< .5 mile.	9/14/1993	No	Observation
Green Gulch, 4140				

Sanders	< .5 mile.	8/17/1993	Yes	Observation
Burnt Bridge Creek, 3360-3371 ft.				

Sanders	< .5 mile.	8/24/1993	No	Observation
Upper Little Beaver Creek				

Sanders	< .5 mile.	9/4/1993	Yes	Observation
South Branch of Beaver Creek				

Sanders	< .5 mile.	/ / 0	Yes	Museum Specimen
Emma Creek Reach 6, 4120 ft				

Sanders	.5 to 5 mil	6/23/1962	No	Museum Specimen
Charred Creek, 1.5 mi. up Vermillion River from Willow Creek				

Sanders	.5 to 5 mil	6/22/1962	Yes	Museum Specimen
Lulu Creek, 2.1 mi. from Fishtap Creek up its W. fork				

WESTERN TOAD

Flathead	< .5 mile.	6/7/1993	No	Observation
Gregg Creek				

Flathead	< .5 mile.	5/30/1995	No	Observation
Ashley Creek where enters into Lake Monroe.				

Flathead	< .5 mile.	7/19/1995	Yes	Observation
End of FS RD 9602A				

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WESTERN TOAD (cont.)

Flathead	< .5 mile.	7/19/1995	Yes	Observation
30 m before jct of FS RD 9602 and 9602A (near Griffin Creek)				

Flathead	< .5 mile.	7/19/1995	Yes	Observation
Mouth of Ingalls Creek				

Flathead	< .5 mile.	6/13/1995	Yes	Observation
Between FS RD 538 and Griffin Creek				

Flathead	< .5 mile.	6/ 8/1995	No	Observation
200 m. below FS RD 9784 crossing Griffin Cr.				

Flathead	< .5 mile.	6/13/1995	Yes	Observation
Mouth of Ingalls Cr.				

Flathead	.5 to 5 mil	6/28/1995	No	Observation
In reach #11 H-250 R-85, below Griffin Falls				

Flathead	< .5 mile.	7/10/1995	Yes	Observation
Reach #14 H-336 G-35 in main channel of Griffin Creek				

Flathead	< .5 mile.	7/25/1995	Yes	Observation
Griffin Creek				

Flathead	< .5 mile.	5/23/1995	Yes	Observation
Riparian area of Squaw Meadows Creek				

Flathead	< .5 mile.	8/21/1995	Yes	Observation
Griffin Creek				

Lincoln	.5 to 5 mil	8/31/1977	No	Museum Specimen
O'Brian Creek at Kootenai River				

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WESTERN TOAD (cont.)

Lincoln Eureka	.5 to 5 mil	8/ 2/1952	No	Museum Specimen
Lincoln Head Pete Creek	.5 to 5 mil	7/ 5/1966	No	Museum Specimen
Lincoln Marmot Peak	.5 to 5 mil	6/29/1966	No	Museum Specimen
Lincoln W. Fork Yaak River	.5 to 5 mil	6/26/1966	No	Museum Specimen
Lincoln 0.75 mi. NE of Northwest Peak	.5 to 5 mil	7/ 4/1966	No	Museum Specimen
Lincoln Vinal Lake	< .5 mile.	5/20/1995	Yes	Observation
Lincoln O'Brien Cr. at old Troy City Reservoir, ca 1 mi above jct w/Kootenai R.	< .5 mile.	6/ 1/1995	No	Observation
Lincoln LaFoe Lake (marsh)	< .5 mile.	6/ 1/1995	Yes	Observation
Lincoln Bog at headwaters of unnamed branch (east) of E Fk Pipe Cr Adj to FS RD 753	< .5 mile.	6/ 1/1995	Yes	Observation
Lincoln Horse Lakes	< .5 mile.	6/ 1/1995	Yes	Observation
Lincoln Flower Lake	< .5 mile.	5/31/1995	Yes	Observation

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WESTERN TOAD (cont.)

Lincoln	< .5 mile.	6/15/1995	No	Observation
Spar Lake				
Lincoln	< .5 mile.	6/30/1995	Yes	Observation
Pete Creek Meadows Pond.				
Lincoln	< .5 mile.	5/12/1995	Yes	Observation
Keeler Creek Ponds				
Lincoln	< .5 mile.	7/ 6/1995	Yes	Observation
Blue Creek Headwaters Marsh				
Lincoln	< .5 mile.	7/ 5/1995	Yes	Observation
FS RD 36 - pond along E. side of Rd. ca. 1 mi. S. of Trego				
Lincoln	< .5 mile.	7/29/1995	No	Observation
Amish Colon Pond, end of FS RD 7176				
Lincoln	< .5 mile.	7/28/1995	No	Observation
Rexford townsite				
Lincoln	< .5 mile.	8/ 5/1995	No	Observation
Foot bridge across Little North Fork Big Creek				
Lincoln	< .5 mile.	8/23/1995	No	Observation
On FS RD 688, 0.25 mi. N. of Frank Lake				
Lincoln	< .5 mile.	8/24/1995	Yes	Observation
Horse Lakes				
Lincoln	< .5 mile.	8/26/1995	No	Observation
Highline Trail, ca. 1000 ft above Little Therriault Lake				

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WESTERN TOAD (cont.)

Lincoln	.5 to 5 mil	8/31/1986	No	Museum Specimen Kootenai NF, Bull Lake
Ravalli	.5 to 5 mil	7/ 7/1962	No	Museum Specimen Mosquito Creek; 1.5 mi. (rd.) SW of the Clark Fork River
Sanders	> 10 miles.	7/28/1958	No	Museum Specimen Thompson River
Sanders	< .5 mile.	9/15/1995	No	Observation 1 mi. SW of Swamp Creek trailhead (FS RD 1119)

PACIFIC CHORUS FROG

Flathead	< .5 mile.	6/16/1995	Yes	Observation Powerline Pond, near lower Sunday Lake
Flathead	< .5 mile.	6/12/1995	No	Observation West of Pleasant Valley Mtn.
Lake	< .5 mile.	5/20/1951	No	Museum Specimen Near Columbia Falls, base of Dog Mountain Lookout Tower
Lincoln	< .5 mile.	4/ 2/1995	No	Observation Big Eddy Recreation Area, Clark Fork River
Lincoln	< .5 mile.	4/ 3/1995	No	Observation Bull River backwater pond along HWY 56
Lincoln	< .5 mile.	4/27/1995	Yes	Observation Bad Medicine Campground Pond

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PACIFIC CHORUS FROG(cont.)

Lincoln	< .5 mile.	4/10/1995	No	Observation
McKillop Creek Road (FS RD 535) pond A				

Lincoln	< .5 mile.	4/10/1995	No	Observation
McKillop Creek Road (FS RD 535) pond B				

Lincoln	< .5 mile.	4/10/1995	No	Observation
Silver Butte Fisher River Oxbow				

Lincoln	< .5 mile.	4/29/1995	No	Observation
Arnold's Pond				

Lincoln	< .5 mile.	4/28/1995	No	Observation
Vinal Lake road pond B				

Lincoln	.5 to 5 mil	7/25/1946	No	Museum Specimen
Top of Horse Hill				

Lincoln	< .5 mile.	6/30/1995	Yes	Observation
Pete Creek Meadows Pond.				

Lincoln	< .5 mile.	5/12/1995	No	Observation
Keeler Creek Ponds				

Lincoln	< .5 mile.	7/ 6/1995	Yes	Observation
Blue Creek Headwaters Marsh				

Lincoln	< .5 mile.	6/26/1995	Yes	Observation
Dodge Creek duck pond.				

Sanders	< .5 mile.	5/13/1956	No	Museum Specimen
Trout Creek, 2360 ft.				

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PACIFIC CHORUS FROG(cont.)

Sanders White Pine	< .5 mile.	5/13/1956	No	Museum Specimen
Sanders Noxon	< .5 mile.	5/12/1956	No	Museum Specimen
Sanders Mosquito Lake; 3.5 mi. (rd.) SW of Clark Fork River	.5 to 5 mil	7/ 7/1962	No	Museum Specimen
Sanders Old oxbows on Clark's Fork N. of HWY 200, ca. 2 mi. N. of Noxon	< .5 mile.	6/ 2/1995	No	Observation

BULLFROG

Sanders Swamp Creek Rd. Pond on Bob Tuma Property.	5 to 10 mil	7/ /1994	No	Observation
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NORTHERN LEOPARD FROG

Flathead Near Marion, Bitterroot Creek	.5 to 5 mil	/ / 0	No	Museum Specimen
Lincoln Eureka	.5 to 5 mil	7/31/1922	No	Museum Specimen
Lincoln Lost Lake Marsh (between Lost and Rock Lakes)	< .5 mile.	6/25/1995	Yes	Observation
Lincoln Lost Lake Ponds	< .5 mile.	8/ 2/1995	No	Observation

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NORTHERN LEOPARD FROG (cont.)

Lincoln	< .5 mile.	8/25/1995	No	Observation
Lost Lake Marsh				

Sanders	.5 to 5 mil	7/23/1975	No	Specimen Reported
Junction Graves Creek with Clark Fork				

Sanders	.5 to 5 mil	/ /1985	No	Observation
Cabinet Gorge Reservoir, along shoreline at Noxon				

Sanders	.5 to 5 mil	/ /1985	No	Observation
Pond formed between BN rail grade and HWY 200				

Sanders	< .5 mile.	/ /1985	No	Observation
Pond formed between BN railroad and HWY 200				

SPOTTED FROG

Flathead	< .5 mile.	4/30/1995	Yes	Observation
Powerline Pond, near lower Sunday Lake				

Flathead	< .5 mile.	7/11/1949	No	Museum Specimen
Marion, Ashley Creek				

Flathead	< .5 mile.	7/16/1949	No	Museum Specimen
Marion, Rogers Lake				

Flathead	< .5 mile.	/ /1993	No	Observation
Squaw Meadows				

Flathead	< .5 mile.	7/ /1994	No	Observation
Listle Creek				

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SPOTTED FROG (cont.)

Flathead	< .5 mile.	/ /1993	No	Observation
Swanson Creek				

Flathead	< .5 mile.	7/21/1993	No	Observation
Tributary to Good Creek, middle of section				

Flathead	< .5 mile.	6/15/1993	No	Observation
Corduroy Creek				

Flathead	< .5 mile.	/ /1993	No	Observation
Meltwater ponds E. of pavilion				

Flathead	< .5 mile.	6/ 4/1995	Yes	Observation
Lake Rogers				

Flathead	< .5 mile.	6/ 4/1995	No	Observation
Lake Rogers				

Flathead	< .5 mile.	7/ 5/1995	Yes	Observation
Paul Creek beaver ponds				

Flathead	< .5 mile.	7/19/1995	Yes	Observation
End of FS RD 9602A				

Flathead	< .5 mile.	7/19/1995	No	Observation
Mouth of Ingalls Creek				

Flathead	< .5 mile.	6/13/1995	No	Observation
Between FS RD 538 and Griffin Creek				

Flathead	< .5 mile.	7/ 7/1995	No	Observation
Griffin Cr, upper end of 1st open meadow/willow area above pvt boundary				

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SPOTTED FROG (cont.)

Flathead	< .5 mile.	6/13/1995	No	Observation
Mouth of Ingalls Cr.				

Flathead	.5 to 5 mil	6/28/1995	No	Observation
In reach #11 H-250 R-85, below Griffin Falls				

Flathead	< .5 mile.	7/10/1995	No	Observation
Reach #14 H-336 G-35 in main channel of Griffin Creek				

Flathead	< .5 mile.	7/10/1995	Yes	Observation
Reach #14 H-354 G-35 in main channel of Griffin Creek				

Flathead	< .5 mile.	7/25/1995	Yes	Observation
Reach #14 H-358 G-35 in main channel of Griffin Creek				

Flathead	< .5 mile.	5/23/1995	Yes	Observation
Small pond very close to Squaw Meadows Creek				

Flathead	< .5 mile.	6/13/1995	No	Observation
Small tributary to Herrig Creek				

Flathead	< .5 mile.	8/21/1995	Yes	Observation
Griffin Creek				

Flathead	< .5 mile.	8/24/1995	No	Observation
Outflow of Lupine Line (1 mi. up from Griffin)				

Lake	.5 to 5 mil	/ / 0	No	Museum Specimen
Marion, Bitterroot Lake				

Lincoln	< .5 mile.	9/18/1994	Yes	Observation
At first bridge crossing Lake Creek, on Lake Creek Drive, S. of Troy				

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SPOTTED FROG (cont.)				
Lincoln	.5 to 5 mil	8/31/1977	No	Museum Specimen
Granite Creek, HWY 2, S. of Libby				
Lincoln	5 to 10 mil	8/31/1977	No	Museum Specimen
Libby Creek at St. Regis Mill				
Lincoln	< .5 mile.	4/ 2/1995	Yes	Observation
Big Eddy Recreation Area, Clark Fork River				
Lincoln	< .5 mile.	4/ 3/1995	Yes	Observation
Bull River backwater pond along HWY 56				
Lincoln	< .5 mile.	4/29/1995	Yes	Observation
Lost Lake Marsh (between Lost and Rock Lakes)				
Lincoln	< .5 mile.	4/15/1995	Yes	Observation
Yaak River, Whitetail Campground, Pond B				
Lincoln	< .5 mile.	4/27/1995	Yes	Observation
Blue Creek Road (FS RD 615) pond, ca. 1 mi. E. of FS RD 68				
Lincoln	< .5 mile.	4/10/1995	Yes	Observation
Silver Butte Fisher River Oxbow				
Lincoln	< .5 mile.	4/30/1995	Yes	Observation
Wolf Creek headquarters pond				
Lincoln	< .5 mile.	4/28/1995	Yes	Observation
Vinal Lake road pond B				
Lincoln	< .5 mile.	4/30/1995	No	Observation
Lower Sunday Lake pond				

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SPOTTED FROG (cont.)				
Lincoln Libby	.5 to 5 mil	10/ 1/1922	No	Museum Specimen
Lincoln Rexford, Lime Creek	< .5 mile.	7/12/1949	No	Museum Specimen
Lincoln Libby, Wolf Creek Pond	< .5 mile.	6/12/1949	No	Museum Specimen
Lincoln Yaak, Pete Creek Meadows	< .5 mile.	6/15/1949	No	Museum Specimen
Lincoln Stryker, Stryker Lake, 3350 ft.	< .5 mile.	7/26/1949	No	Museum Specimen
Lincoln Near Libby, Cherry Creek	.5 to 5 mil	/ / 0	No	Museum Specimen
Lincoln Near Troy, Schoolhouse Lake	.5 to 5 mil	/ / 0	No	Museum Specimen
Lincoln Vicinity of Libby, Middle Thomason Lake	.5 to 5 mil	/ / 0	No	Museum Specimen
Lincoln 10 mi. S. of Libby, Libby Fish Hatchery Spring	< .5 mile.	/ / 0	No	Museum Specimen
Lincoln Dry Cr. at HWY 56	.5 to 5 mil	8/29/1984	No	Specimen Reported
Lincoln Head Pete Creek	.5 to 5 mil	7/ 4/1966	No	Specimen Reported

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SPOTTED FROG (cont.)

Lincoln	5 to 10 mil	7/ 9/1966	No	Specimen Reported
Pete Creek				
Lincoln	.5 to 5 mil	6/26/1966	No	Specimen Reported
West Fork Yaak River				
Lincoln	< .5 mile.	5/20/1995	No	Observation
Vinal Lake				
Lincoln	< .5 mile.	6/ 1/1995	Yes	Observation
LaFoe Lake (marsh)				
Lincoln	< .5 mile.	6/ 1/1995	Yes	Observation
Bog at headwaters of unnamed branch (east) of E Fk Pipe Cr Adj to FS RD 753				
Lincoln	< .5 mile.	6/ 1/1995	Yes	Observation
Horse Lakes				
Lincoln	< .5 mile.	5/31/1995	Yes	Observation
Flower Lake				
Lincoln	< .5 mile.	5/31/1995	No	Observation
Granite Creek overflow just N. of HWY 2 by Libby.				
Lincoln	< .5 mile.	6/16/1995	Yes	Observation
Dickey Lake				
Lincoln	< .5 mile.	6/22/1995	Yes	Observation
McKillop Creek Road (FS RD 535) pond A				
Lincoln	< .5 mile.	6/15/1995	Yes	Observation
Bad Medicine Campground Pond				

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SPOTTED FROG (cont.)				
Lincoln	< .5 mile.	6/30/1995	Yes	Observation
Pete Creek Meadows Pond.				
Lincoln	< .5 mile.	6/15/1995	No	Observation
Keeler Creek Ponds				
Lincoln	< .5 mile.	7/ 6/1995	Yes	Observation
Blue Creek Headwaters Marsh				
Lincoln	< .5 mile.	7/ 5/1995	Yes	Observation
Louis Lake Ponds				
Lincoln	< .5 mile.	7/ 5/1995	Yes	Observation
FS RD 36 - pond along E. side of Rd. ca. 1 mi. S. of Trego				
Lincoln	< .5 mile.	7/ 7/1995	Yes	Observation
Drop Creek; headwaters pond.				
Lincoln	< .5 mile.	6/26/1995	Yes	Observation
Dodge Creek duck pond.				
Lincoln	< .5 mile.	7/21/1995	No	Observation
Spruce Lake				
Lincoln	< .5 mile.	7/20/1995	No	Observation
South pond off FS RD 4792				
Lincoln	< .5 mile.	8/24/1995	No	Observation
Horse Lakes				
Lincoln	.5 to 5 mil	8/31/1986	No	Museum Specimen
Kootenai NF, Bull Lake, SW shore				

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SPOTTED FROG (cont.)

Lincoln	< .5 mile.	8/20/1994	Yes	Observation Beaver pond/bog lemming site near FS RD 315 on Sunday Cr.
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Lincoln	< .5 mile.	8/21/1994	No	Observation Big Creek
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Sanders	> 10 miles.	8/ 4/1993	No	Museum Specimen Trout Creek, 4200 ft.
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Sanders	< .5 mile.	9/19/1994	Yes	Observation Where bridge crosses West Fork of Elk Creek
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Sanders	< .5 mile.	9/17/1994	Yes	Observation In outlet section of Lower Geiger Lake (E. end)
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Sanders	.5 to 5 mil	8/25/1960	No	Museum Specimen Noxon Rapids Reservoir, Thompson Falls
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Sanders	5 to 10 mil	7/28/1958	No	Museum Specimen Little Thompson River
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Sanders	.5 to 5 mil / / 0	No	Museum Specimen 40 mi. S. of Libby, Crystal Lake
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Sanders	< .5 mile.	7/25/1950	No	Museum Specimen Cabinet Mountains, Fish Trap Lake, near outlet of Radio Creek
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Sanders	.5 to 5 mil	5/13/1956	No	Museum Specimen Trout Creek, 2890 ft.
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Sanders	.5 to 5 mil	6/26/1956	No	Museum Specimen White Pine, Blue Slide Road
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SPOTTED FROG (cont.)

Sanders	< .5 mile.	6/26/1956	No	Museum Specimen Thompson River Road, Area #1
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Sanders	5 to 10 mil	/ /1967	No	Museum Specimen Vicinity of Noxon Dam
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Sanders	.5 to 5 mil	6/23/1962	No	Specimen Reported Indian Cr.; 0.1 mi. from junction Thompson R.
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Sanders	< .5 mile.	6/29/1995	Yes	Observation Willow Creek Ponds--Pond D
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Sanders	< .5 mile.	6/29/1995	Yes	Observation Big Beaver Creek Beaver Ponds
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Sanders	< .5 mile.	7/16/1995	Yes	Observation Ulm Peak ponds
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Sanders	< .5 mile.	7/22/1995	Yes	Observation Fishtrap Lake, Radio Creek outlet.
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Sanders	< .5 mile.	7/26/1995	No	Observation Rock Creek, 0.25 mi. E. of HWY 200
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Sanders	< .5 mile.	7/27/1995	No	Observation Swamp Creek
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Sanders	< .5 mile.	7/28/1995	No	Observation Mouth of Marten Creek
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SNAPPING TURTLE

Sanders	.5 to 5 mil	/ /1988	No	Observation Elk Cr. Rd. just south of Beaver Cr. Rd.
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PAINTED TURTLE

Flathead	< .5 mile.	/ /1993	No	Observation Tally Lake, NW of outlet
Flathead	< .5 mile.	6/ 4/1995	No	Observation Lake Rogers
Lincoln	.5 to 5 mil	/ /1952	No	Museum Specimen Lower Thompson Lake
Lincoln	< .5 mile.	6/ 2/1995	No	Observation Ponds near Libby wastewater treatment plant
Lincoln	< .5 mile.	5/31/1995	No	Observation Granite Creek overflow just N. of HWY 2 by Libby.
Lincoln	< .5 mile.	6/15/1995	No	Observation Black Lake
Lincoln	< .5 mile.	6/25/1995	No	Observation Lost Lake Marsh (between Lost and Rock Lakes)
Lincoln	< .5 mile.	6/ 8/1995	No	Observation Costich Lake
Lincoln	< .5 mile.	6/ 8/1995	No	Observation Baney Lake and pond to north.
Lincoln	< .5 mile.	8/ 2/1995	No	Observation Rock Lake
Lincoln	< .5 mile.	7/31/1995	No	Observation Frank Lake

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PAINTED TURTLE (cont.)

Lincoln	< .5 mile.	7/31/1995	No	Observation
Grob Lake and 2 ponds to NE				
Lincoln	< .5 mile.	7/28/1995	No	Observation
Alkali Lake				
Lincoln	< .5 mile.	7/16/1995	No	Observation
Phills Lake				
Sanders	.5 to 5 mil	/ /1952	No	Museum Specimen
Lower Thompson Lake				
Sanders	< .5 mile.	6/ 2/1995	No	Observation
Clark Fork backwater on N. side HWY 200 across river from Noxon				
Sanders	< .5 mile.	7/15/1995	No	Observation
Old oxbows on Clark's Fork, N. of HWY 200, ca. 2 mi. N. of Noxon				
Sanders	< .5 mile.	7/15/1995	No	Observation
Clark Fork backwater, ca. 1 mi. N. of Noxon				

NORTHERN ALLIGATOR LIZARD

Lincoln	< .5 mile.	5/ 7/1994	No	Observation
5 miles up Big Creek from Lake Koocanusa				
Lincoln	< .5 mile.	7/12/1949	No	Museum Specimen
Eureka, Pinkham Creek				
Lincoln	< .5 mile.	5/27/1995	No	Observation
Ca. 3 mi. SSE of Troy on tree farm.				

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NORTHERN ALLIGATOR LIZARD (cont.)

Sanders	< .5 mile.	7/23/1995	No	Observation
Thompson River Road (HWY 56), ca. 5 mi. N. of HWY 200				
Sanders	< .5 mile.	7/27/1995	No	Observation
Swamp Creek, 0.75 mi. SW of wilderness				
Sanders	< .5 mile.	7/27/1995	No	Observation
Swamp Creek, 1 mi. SW of wilderness				
Sanders	< .5 mile.	7/27/1995	No	Observation
Swamp Creek, 2 mi. SW of wilderness				
Sanders	< .5 mile.	7/28/1995	No	Observation
1.6 mi. N. of intersection with Blue Slide Road on FS RD 154				

WESTERN SKINK

Lincoln	< .5 mile.	5/17/1918	No	Observation
Ca. 3 mi. SSE of Troy on tree farm.				
Lincoln	< .5 mile.	7/ /1995	No	Observation
Camp 32, 4.2 mi. S. of Rexford				

RUBBER BOA

Flathead	< .5 mile.	9/ 9/1995	No	Observation
N. Fk. Idaho Cr., Idaho Hill Rd, Marion				
Lincoln	< .5 mile.	7/15/1994	No	Observation
Off Callahan R. Road in open P. pine stand; 2520 ft.				

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RUBBER BOA (cont.)

Lincoln	< .5 mile.	6/24/1994	No	Observation
Cutoff Rd. between Yaak R. Rd. and HWY 2; 2400 ft.				

Sanders	.5 to 5 mil	7/27/1962	No	Specimen Reported
2.7 air mi. Sw of Belknap; Mosquito Cr.				

Sanders	< .5 mile.	9/15/1995	No	Observation
1 mi. SW of Swamp Creek trailhead (FS RD 1119)				

RACER

Lincoln	5 to 10 mil	/ / 0	No	Specimen Reported
See map in Davis 1963				

Lincoln	5 to 10 mil	/ / 0	No	Specimen Reported
See map in Davis 1963				

Sanders	.5 to 5 mil	/ / 1952	No	Museum Specimen
Thompson Falls				

GOPHER SNAKE

Sanders	.5 to 5 mil	/ / 1952	No	Museum Specimen
Thompson Falls				

Sanders	.5 to 5 mil	5/16/1995	No	Observation
Eastern edge of Thompson Falls				

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WESTERN TERRESTRIAL GARTER SNAKE

Flathead	.5 to 5 mil	8/18/1895	No	Museum Specimen
Upper Stillwater Lake				

Flathead	< .5 mile.	7/21/1993	No	Observation
Good Creek				

Lincoln	.5 to 5 mil	/ /1952	No	Museum Specimen
Lower Thompson Lake				

Lincoln	.5 to 5 mil	7/26/1958	No	Museum Specimen
Big Creek, Kootenai River				

Lincoln	.5 to 5 mil	7/28/1958	No	Museum Specimen
Tobacco River, near Rexford				

Lincoln	.5 to 5 mil	8/ 2/1952	No	Museum Specimen
Eureka, Therriault Lake				

Lincoln	.5 to 5 mil	/ /1949	No	Museum Specimen
Snowshoe Mine				

Lincoln	< .5 mile.	6/25/1995	No	Observation
Lost Lake Marsh (between Lost and Rock Lakes)				

Lincoln	< .5 mile.	8/ 2/1995	No	Observation
Lost Lake Ponds				

Lincoln	< .5 mile.	7/29/1995	No	Observation
Amish Colon Pond, end of FS RD 7176				

Lincoln	< .5 mile.	7/28/1995	No	Observation
Alkali Lake				

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WESTERN TERRESTRIAL GARTER SNAKE (cont.)				
Lincoln	< .5 mile.	7/23/1995	No	Observation
Upper Elk Creek, FS RD 4422				
Lincoln	< .5 mile.	7/21/1995	No	Observation
Pond 0.25 mi. E. of Spruce Lake				
Lincoln	< .5 mile.	8/24/1995	No	Observation
Turn off rd. from HWY 37 into Rexford				
Lincoln	< .5 mile.	8/24/1995	No	Observation
Big Creek Rd. (FS RD 336) at 4.5 mi. mark				
Sanders	< .5 mile.	5/ 1/1949	No	Museum Specimen
Thompson Falls, Prospect Creek				
Sanders	.5 to 5 mil	/ /1949	No	Museum Specimen
Leigh Lake, Cabinet Mountain				
Sanders	.5 to 5 mil	11/ 2/1951	No	Museum Specimen
8 mi. W. of Noxon				
Sanders	< .5 mile.	6/26/1956	No	Museum Specimen
White Pine, Blue Slide Road				
Sanders	< .5 mile.	6/26/1956	No	Museum Specimen
Thompson Falls, Thompson River Road, Area #2				
Sanders	.5 to 5 mil	6/24/1962	No	Museum Specimen
Jct. Graves Creek with Clark Fork				
Sanders	.5 to 5 mil	7/27/1962	No	Museum Specimen
Mosquito Creek				

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WESTERN TERRESTRIAL GARTER SNAKE (cont.)

Sanders	< .5 mile.	7/15/1995	No	Observation
Old oxbows on Clark's Fork, N. of HWY 200, ca. 2 mi. N. of Noxon				

Sanders	< .5 mile.	7/27/1995	No	Observation
Swamp Creek, at wilderness				

Sanders	< .5 mile.	7/27/1995	No	Observation
Swamp Creek, ca. 2 mi. SW of wilderness				

Sanders	< .5 mile.	7/27/1995	No	Observation
Swamp Creek, ca. 4 mi. SW of wilderness				

Sanders	< .5 mile.	7/27/1995	No	Observation
Swamp Creek Trail				

Sanders	< .5 mile.	7/27/1995	No	Observation
Swamp Creek Trail				

Sanders	< .5 mile.	7/27/1995	No	Observation
Swamp Creek				

COMMON GARTER SNAKE

Flathead	< .5 mile.	7/19/1995	No	Observation
End of FS RD 9602A				

Flathead	< .5 mile.	6/13/1995	No	Observation
Between FS RD 538 and Griffin Creek				

Lincoln	.5 to 5 mil	6/30/1962	No	Museum Specimen
Ca. 3 rd. mi. SE of Rexford				

Lincoln	.5 to 5 mil	6/28/1966	No	Museum Specimen
W. Fork Yaak River				

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COMMON GARTER SNAKE (cont.)				
Lincoln	.5 to 5 mil	7/ 7/1963	No	Museum Specimen
	5.5 mi. SW (rd) of Troy			
Lincoln	< .5 mile.	4/26/1995	No	Observation
	0.3 mi. up Marten Creek Road from S. Fork Marten Road			
Lincoln	< .5 mile.	6/ 1/1995	No	Observation
	LaFoe Lake (marsh)			
Lincoln	< .5 mile.	5/31/1995	No	Observation
	Granite Creek overflow just N. of HWY 2 by Libby.			
Lincoln	< .5 mile.	6/15/1995	No	Observation
	Spar Lake			
Lincoln	< .5 mile.	6/25/1995	No	Observation
	Lost Lake Marsh (between Lost and Rock Lakes)			
Lincoln	< .5 mile.	6/30/1995	No	Observation
	Pete Creek Meadows Pond.			
Lincoln	< .5 mile.	7/29/1995	No	Observation
	Tooley Lake, North end			
Lincoln	< .5 mile.	7/20/1995	No	Observation
	South pond off FS RD 4792			
Lincoln	< .5 mile.	8/24/1995	No	Observation
	FS RD 255, ca. 2. mi. S. of jct with FS RD 336 (Big Creek)			
Sanders	< .5 mile.	5/24/1993	No	Observation
	Lower White Pine Creek road			

Additions to the Kootenai National Forest area since 1 Dec 1994
Montana Reptile and Amphibian Atlas
Species Report 01/09/1996

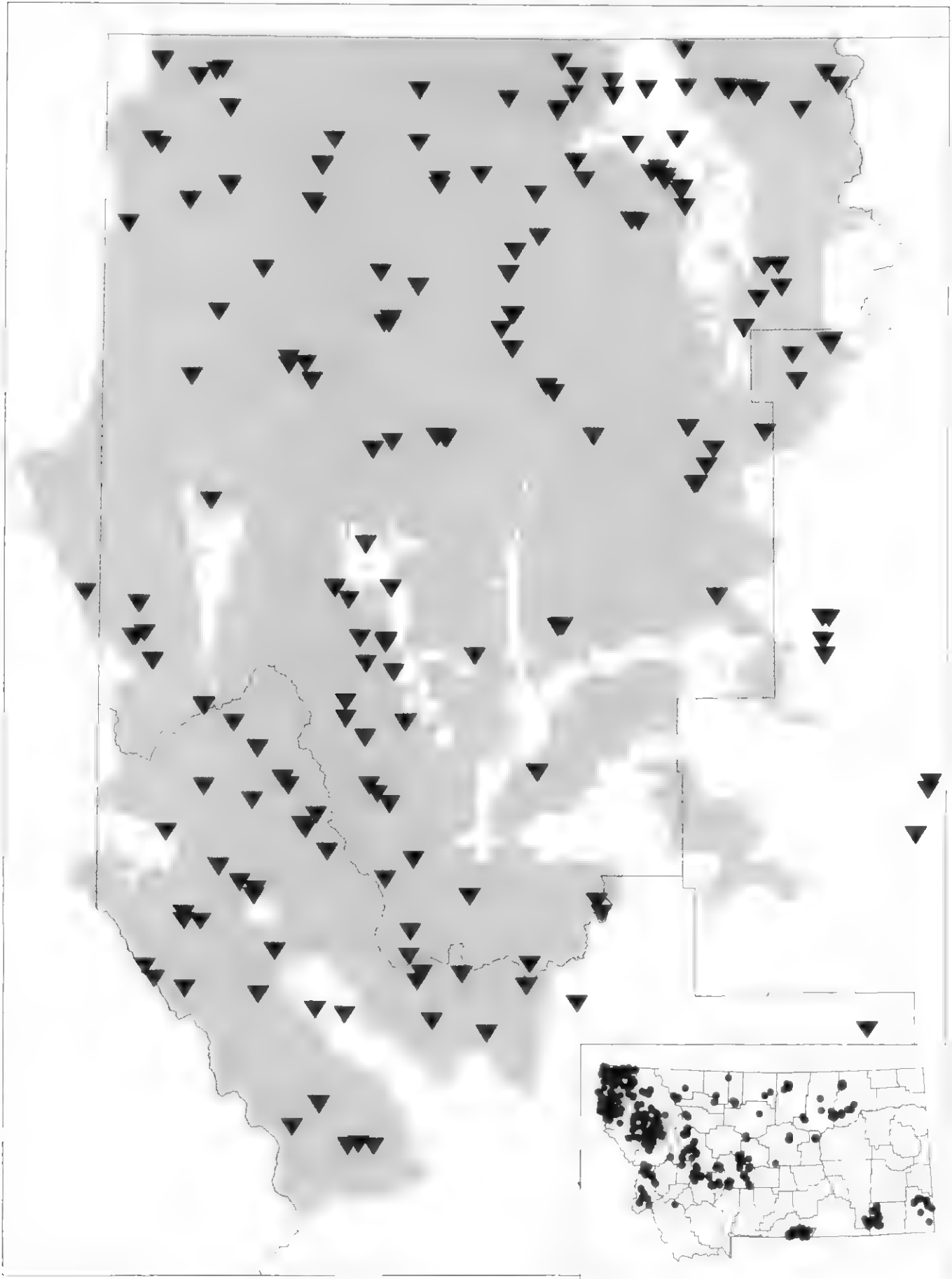
County	Precision	Date	Breed	Data Type
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COMMON GARTER SNAKE (cont.)

Sanders	< .5 mile.	7/22/1995	No	Observation
Fishtrap Lake, Radio Creek outlet.				

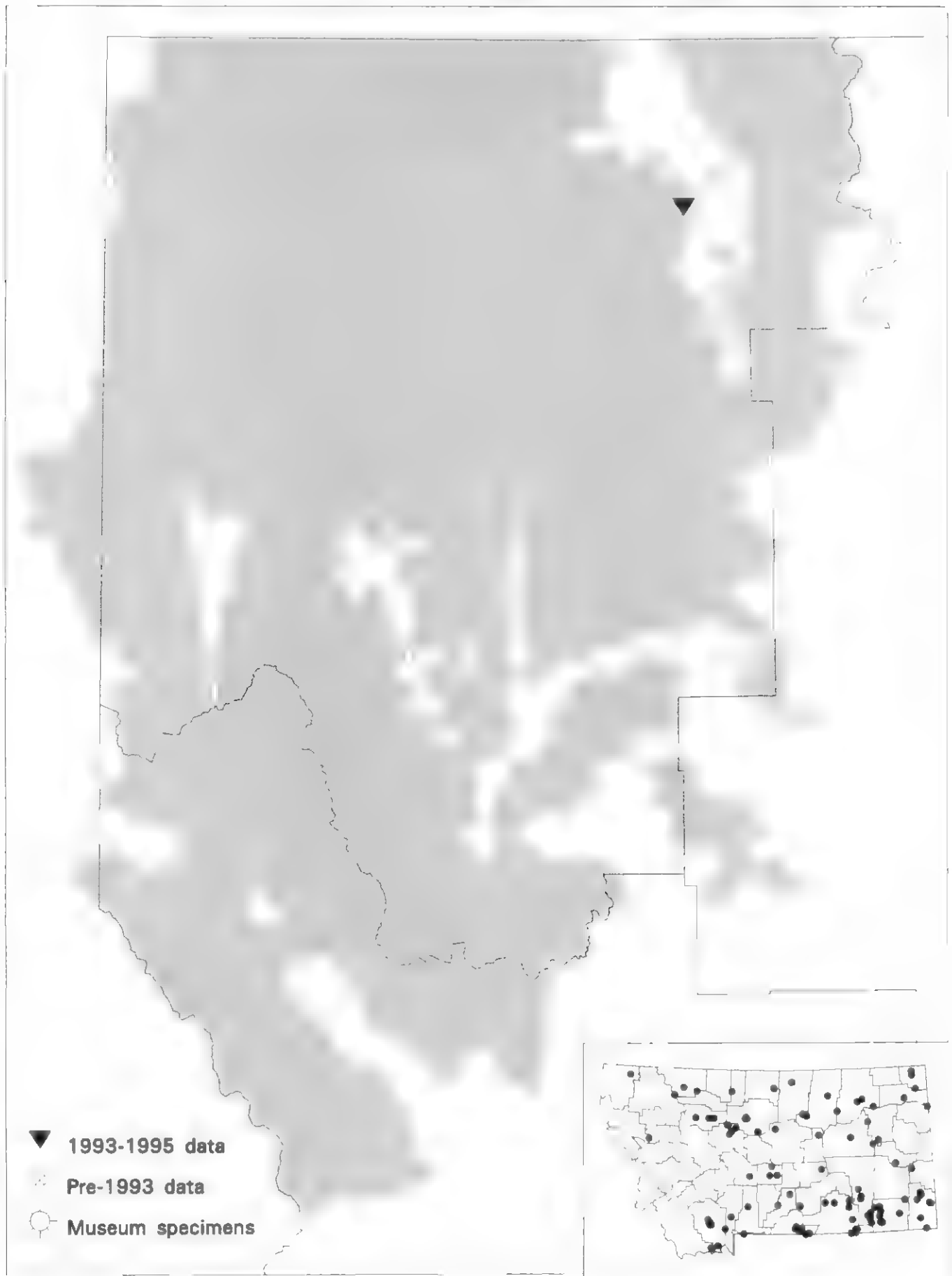
Sanders	< .5 mile.	7/27/1995	No	Observation
Swamp Creek, ca. 3 mi. SW of wilderness				

Amphibian & Reptile Survey Locations
On or near the Kootenai National Forest, Montana



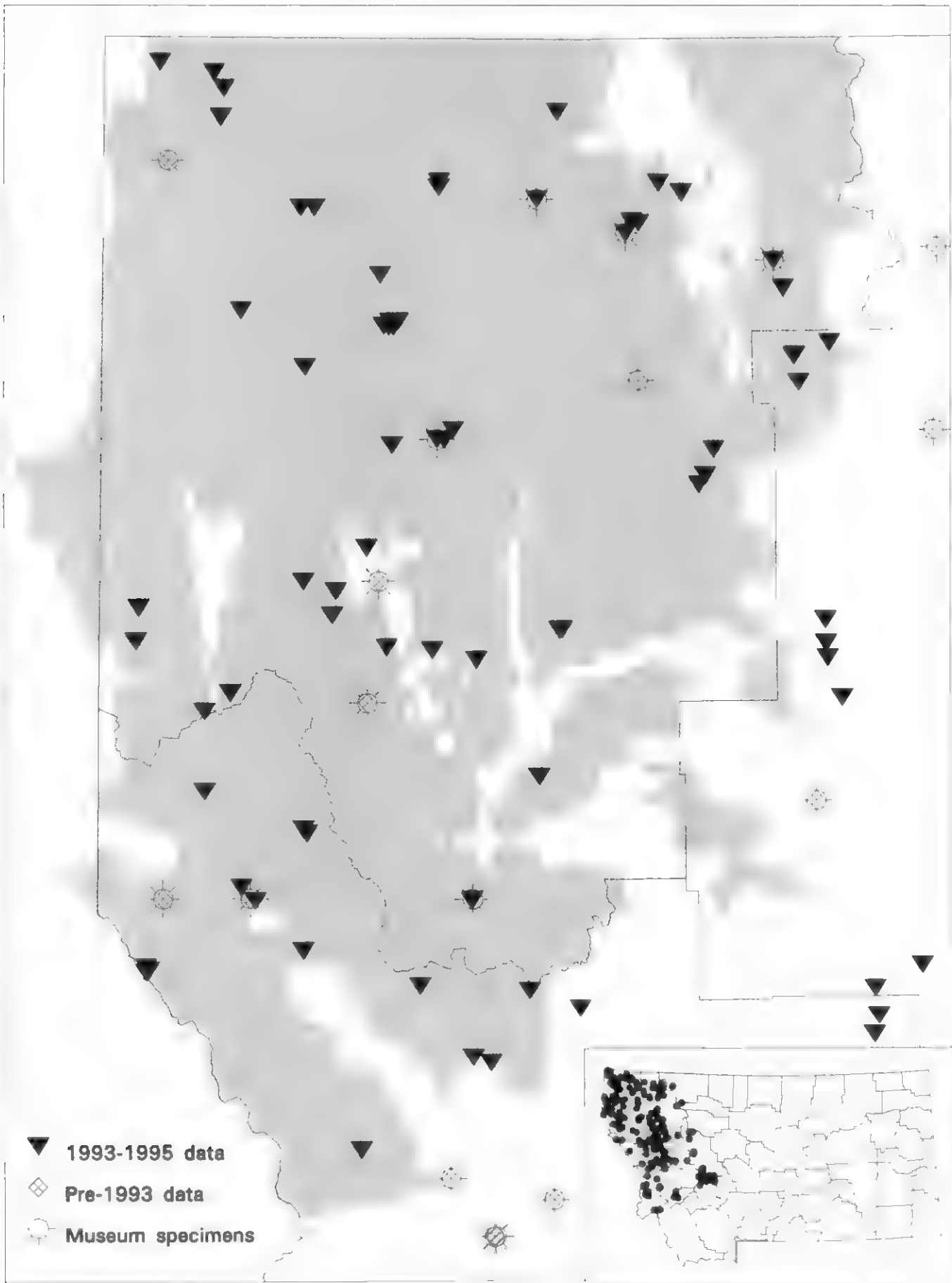
Survey locations from the Montana Natural Heritage Program, February 01, 1996

Ambystoma tigrinum -- Tiger Salamander
Occurrences on or near the Kootenai National Forest, Montana



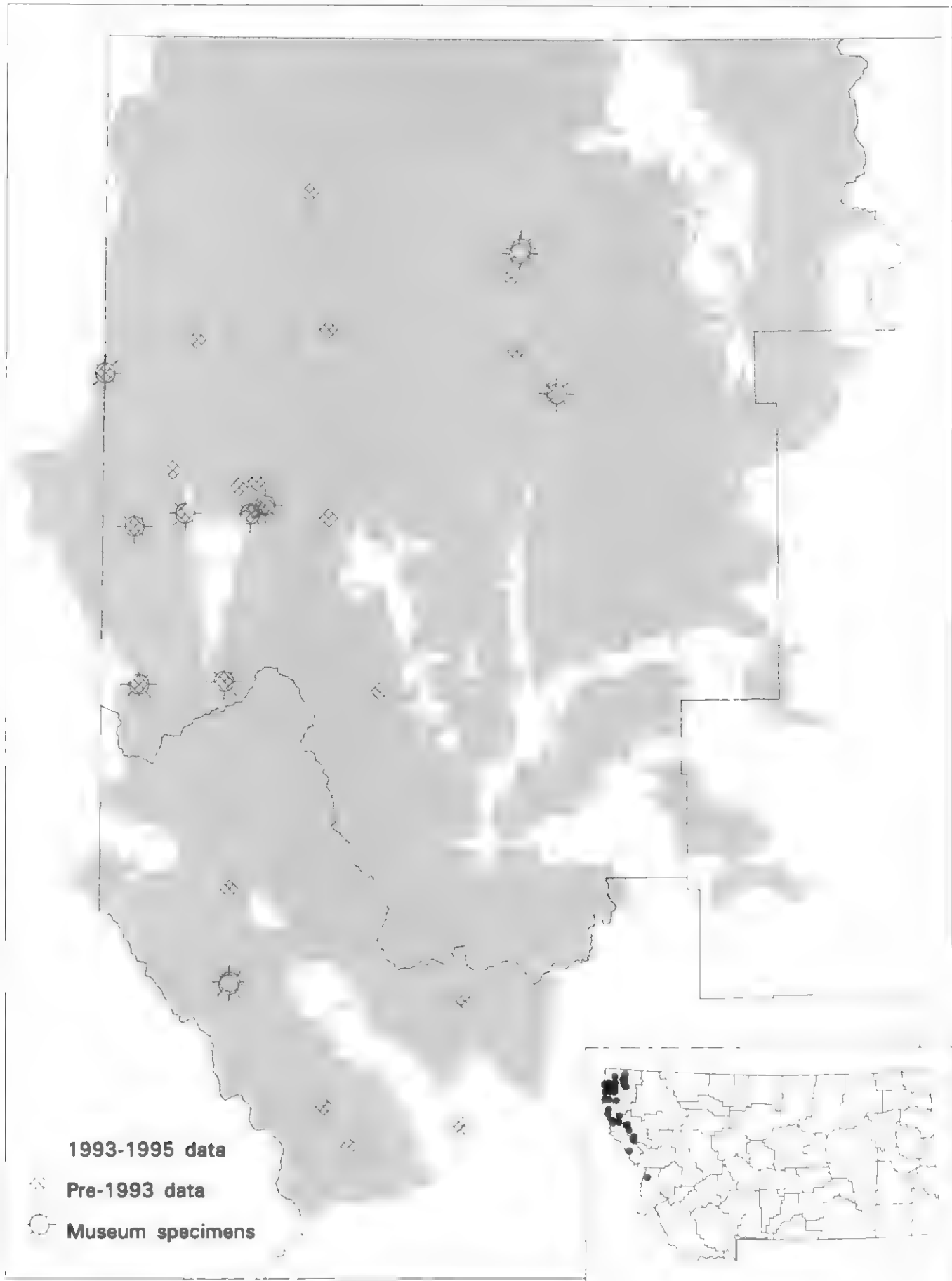
Species locations from the Montana Natural Heritage Program, February 01, 1996

Ambystoma macrodactylum -- Long-toed Salamander
Occurrences on or near the Kootenai National Forest, Montana



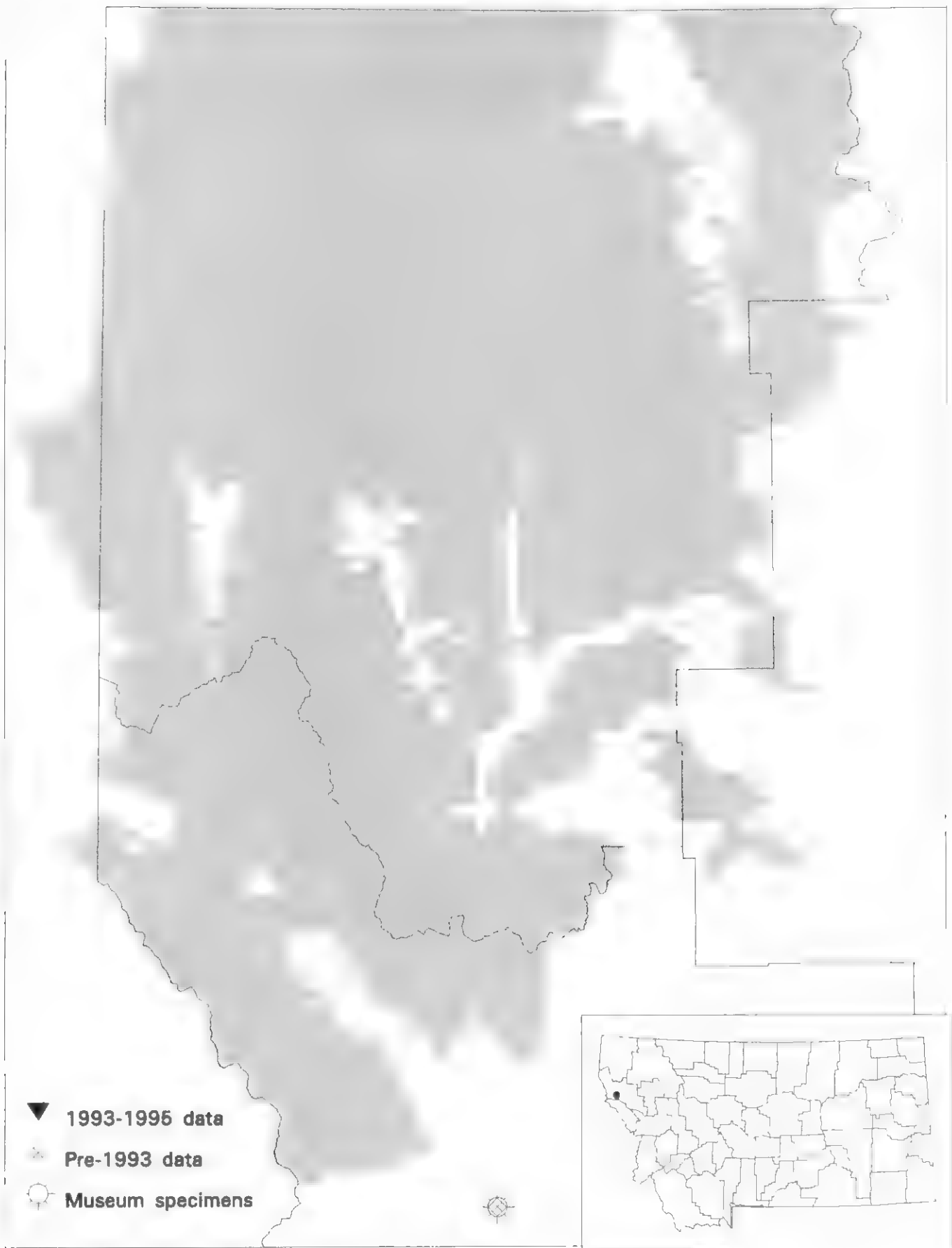
Species locations from the Montana Natural Heritage Program, February 01, 1996

Plethodon idahoensis -- Coeur d'Alene Salamander
Occurrences on or near the Kootenai National Forest, Montana



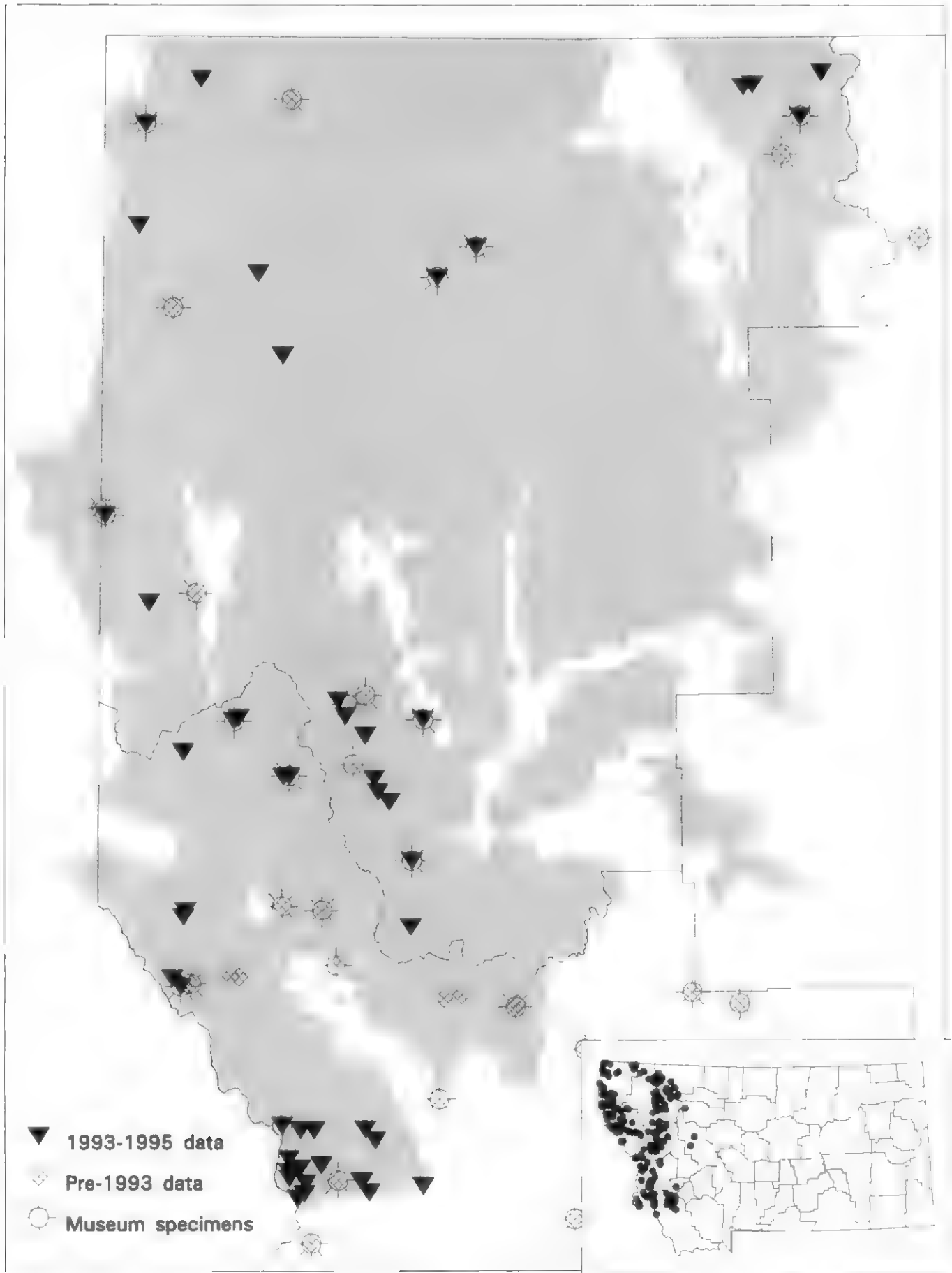
Species locations from the Montana Natural Heritage Program, February 01, 1996

Taricha granulosa -- Roughskin Newt
Occurrences on or near the Kootenai National Forest, Montana



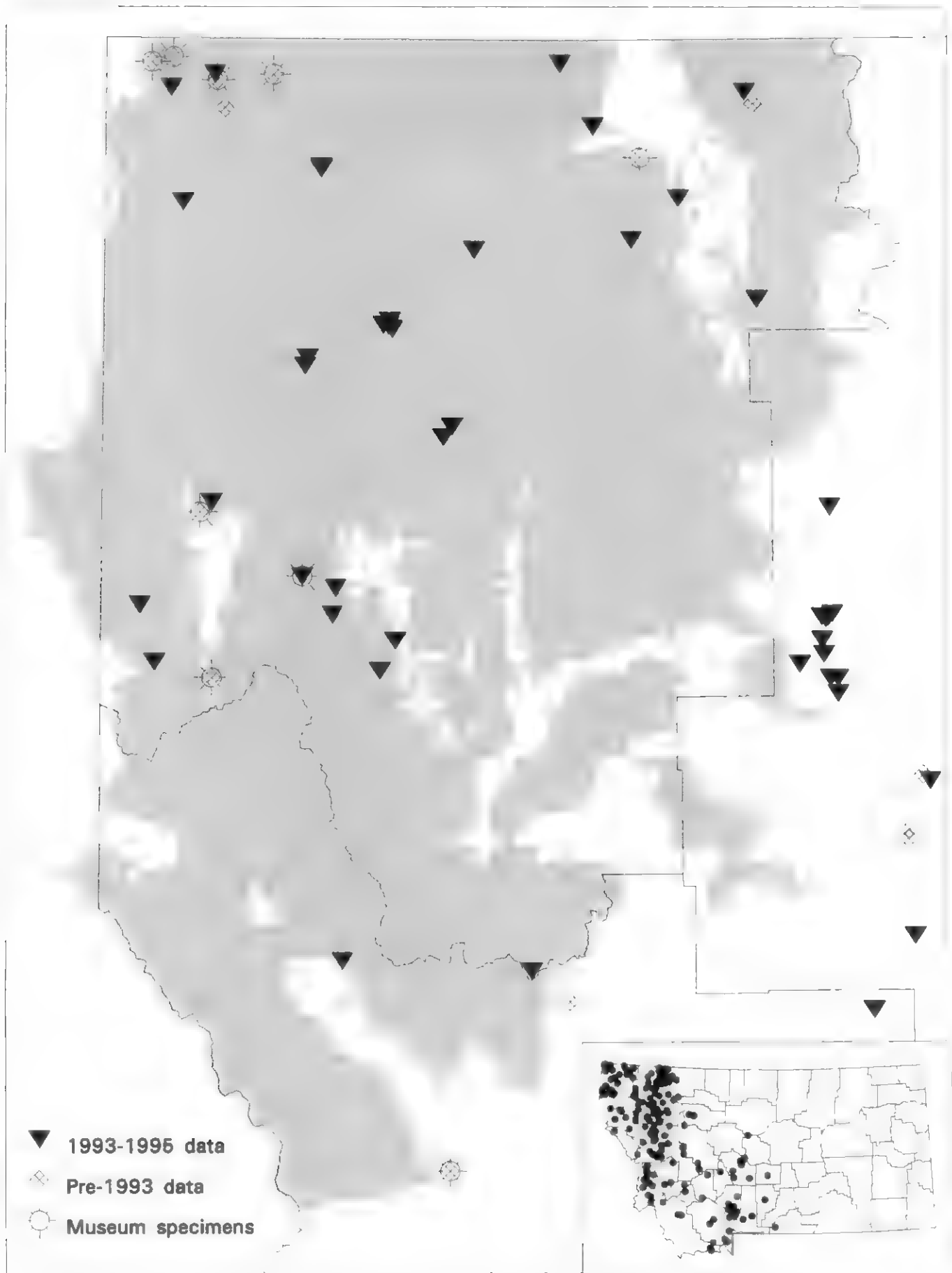
Species locations from the Montana Natural Heritage Program, February 01, 1996

Ascaphus truei -- Tailed Frog
Occurrences on or near the Kootenai National Forest, Montana



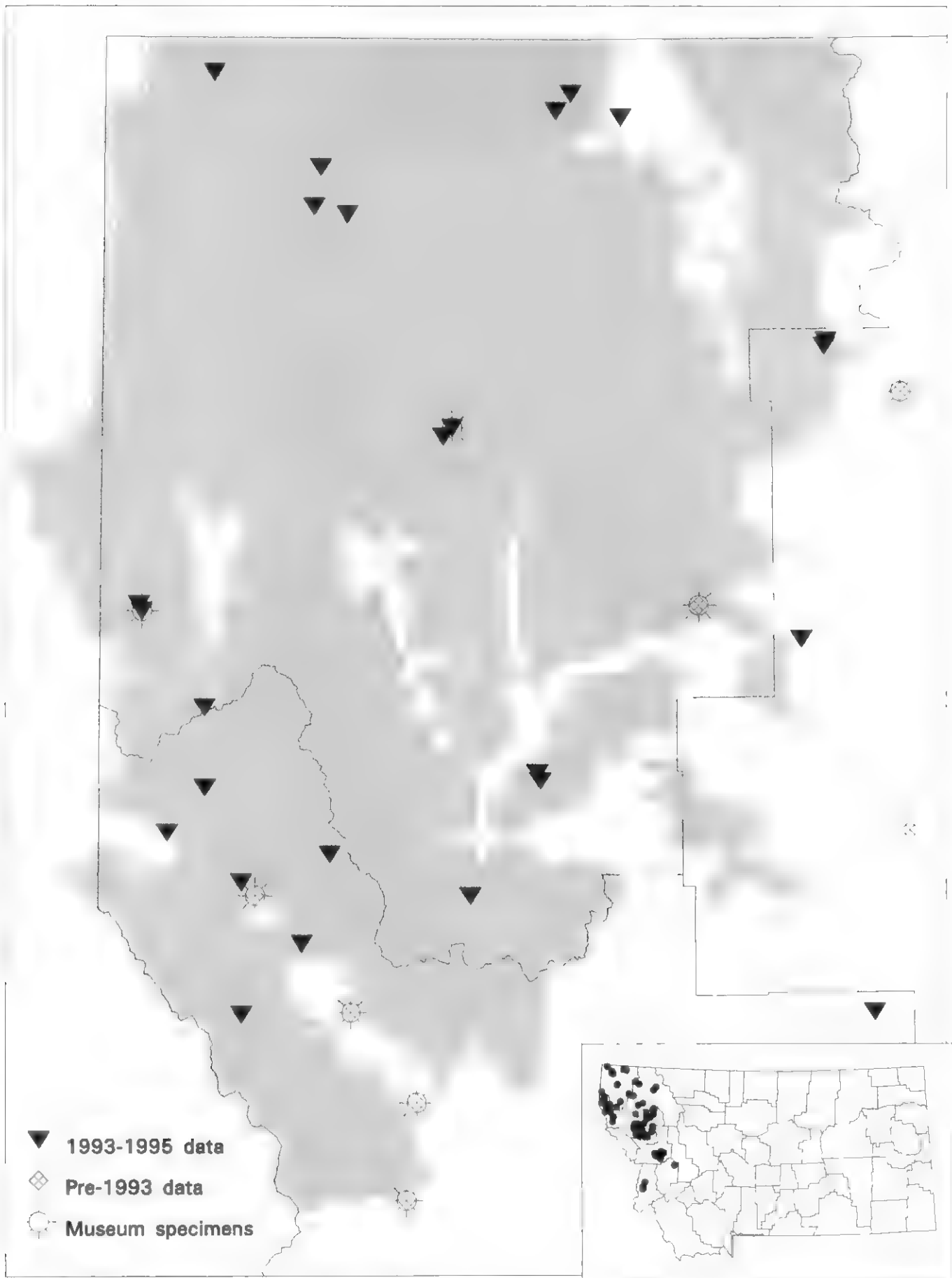
Species locations from the Montana Natural Heritage Program, February 01, 1996

Bufo boreas -- Western Toad
Occurrences on or near the Kootenai National Forest, Montana



Species locations from the Montana Natural Heritage Program, February 01, 1996

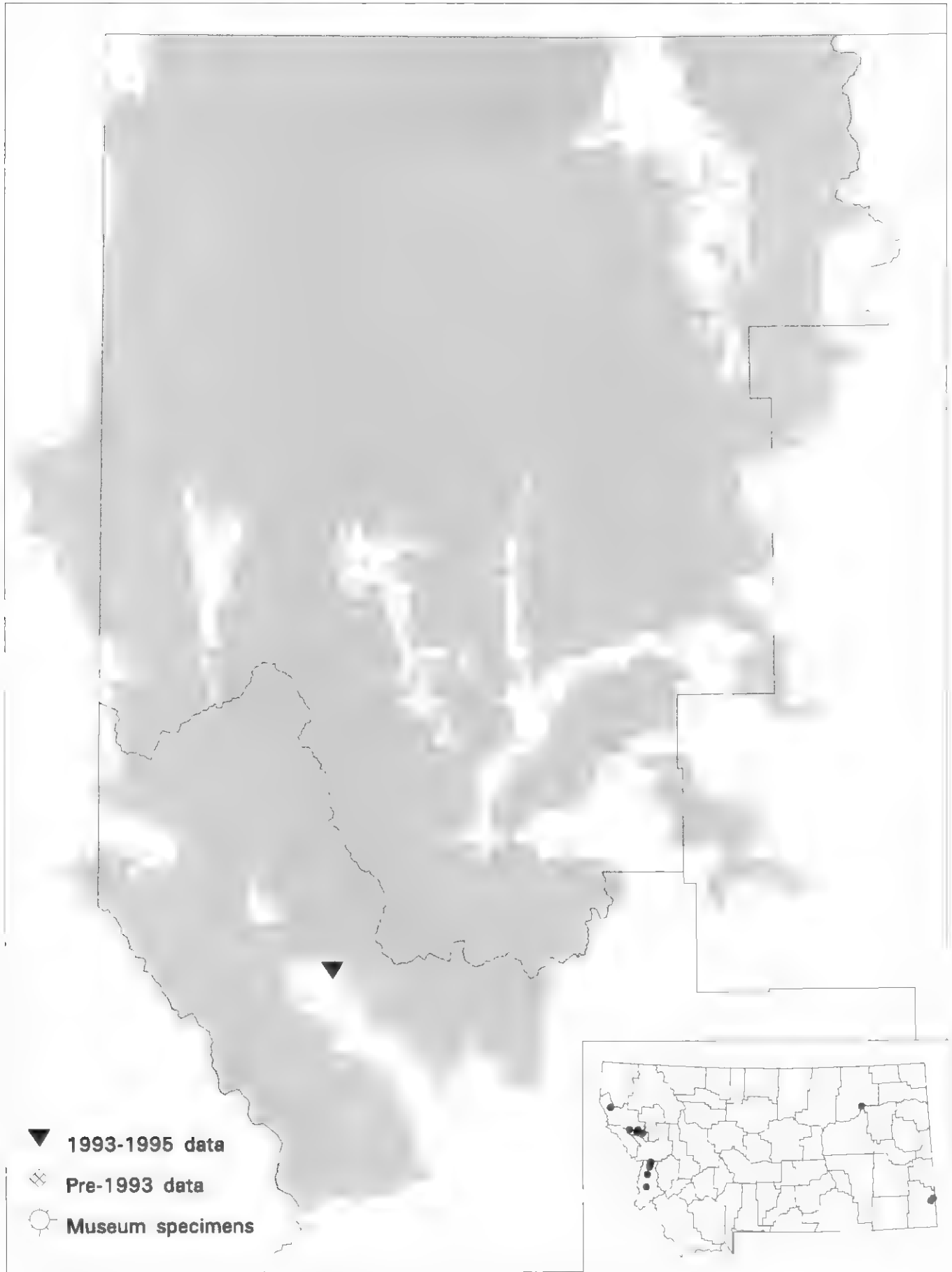
***Pseudacris regilla* -- Pacific Chorus Frog**
Occurrences on or near the Kootenai National Forest, Montana



Species locations from the Montana Natural Heritage Program, February 01, 1996

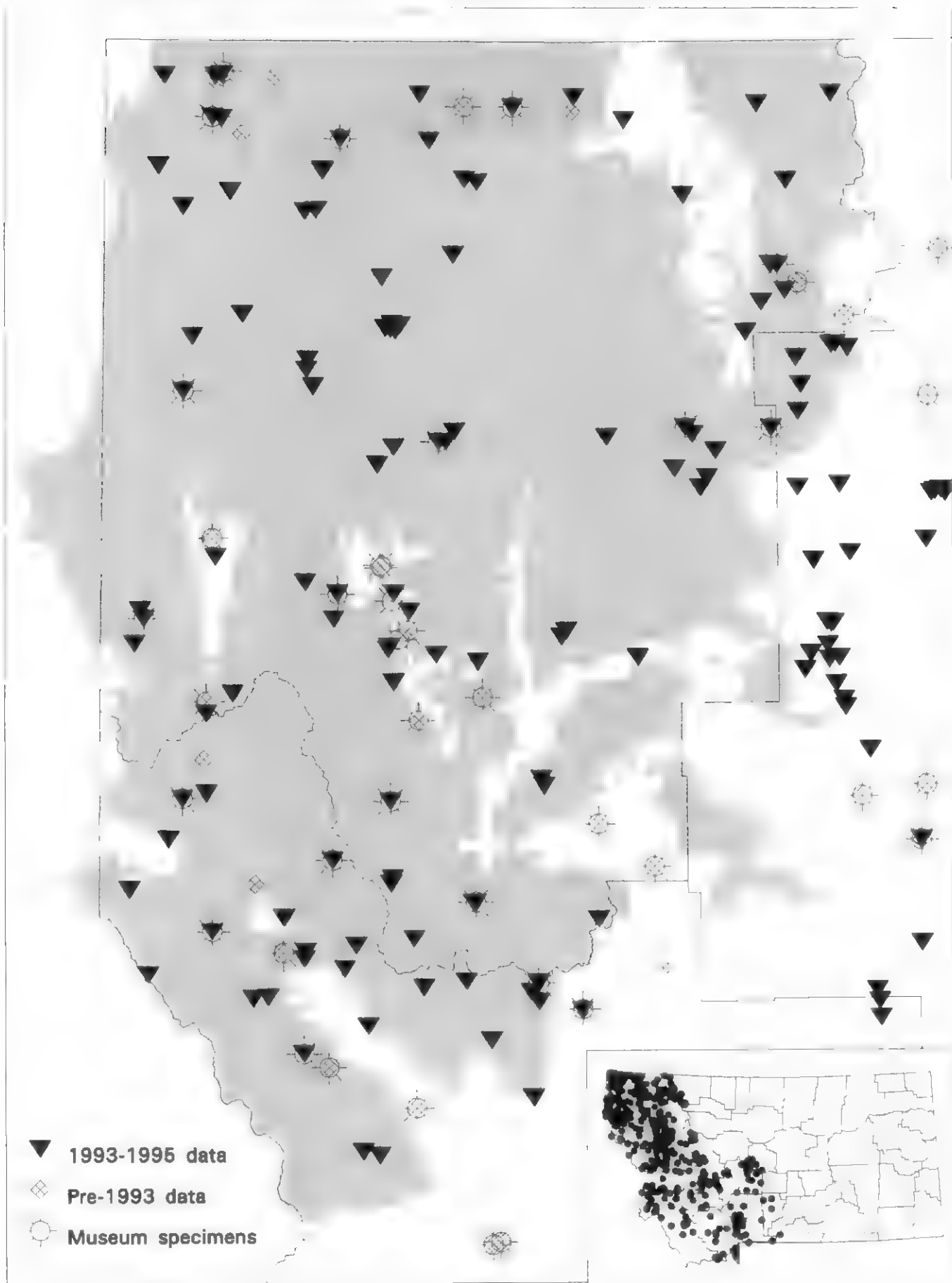
***Rana catesbeiana* -- Bullfrog**

Occurrences on or near the Kootenai National Forest, Montana



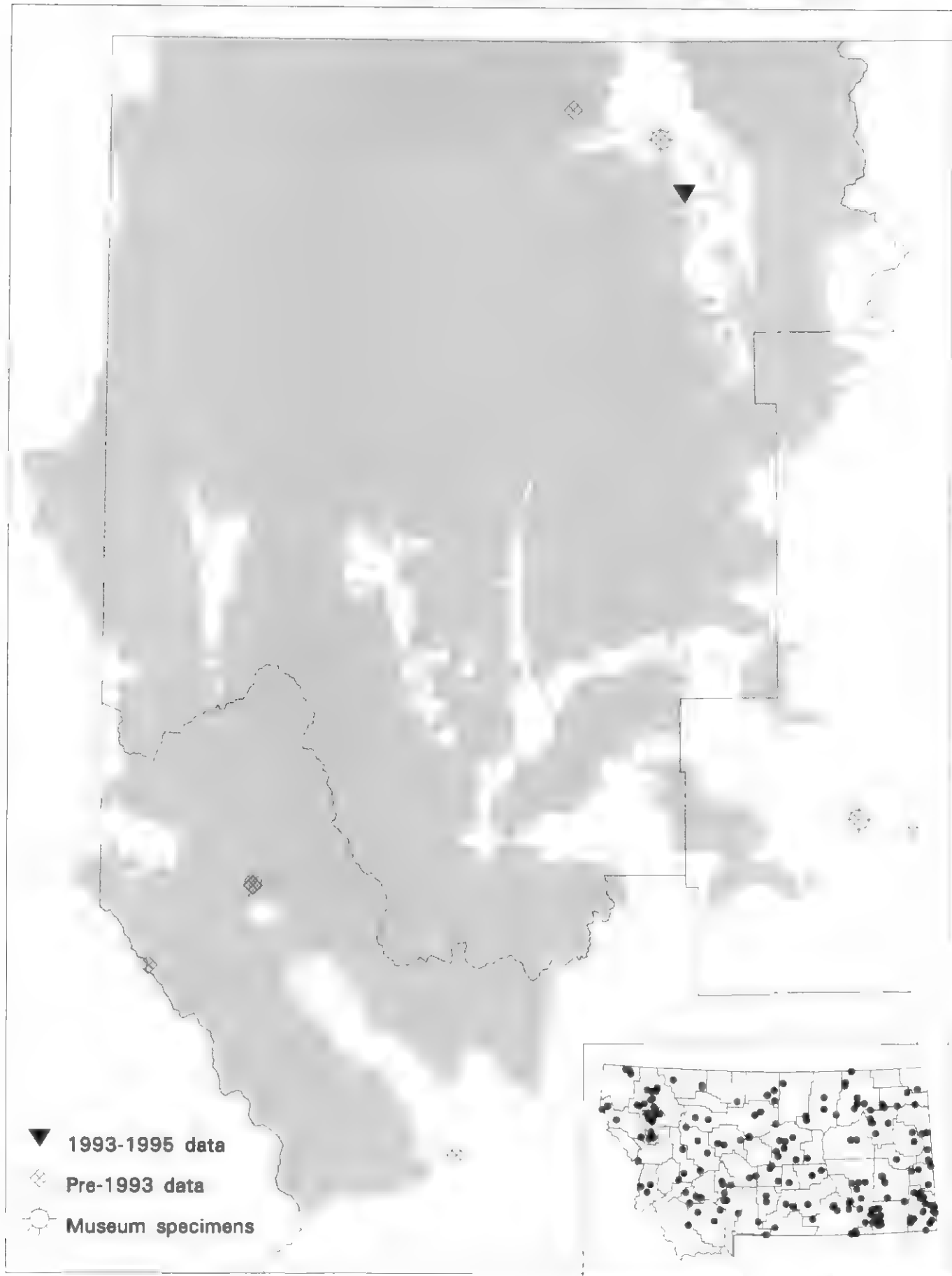
Species locations from the Montana Natural Heritage Program, February 01, 1996

***Rana pretiosa* -- Spotted Frog**
Occurrences on or near the Kootenai National Forest, Montana



Species locations from the Montana Natural Heritage Program, February 01, 1996

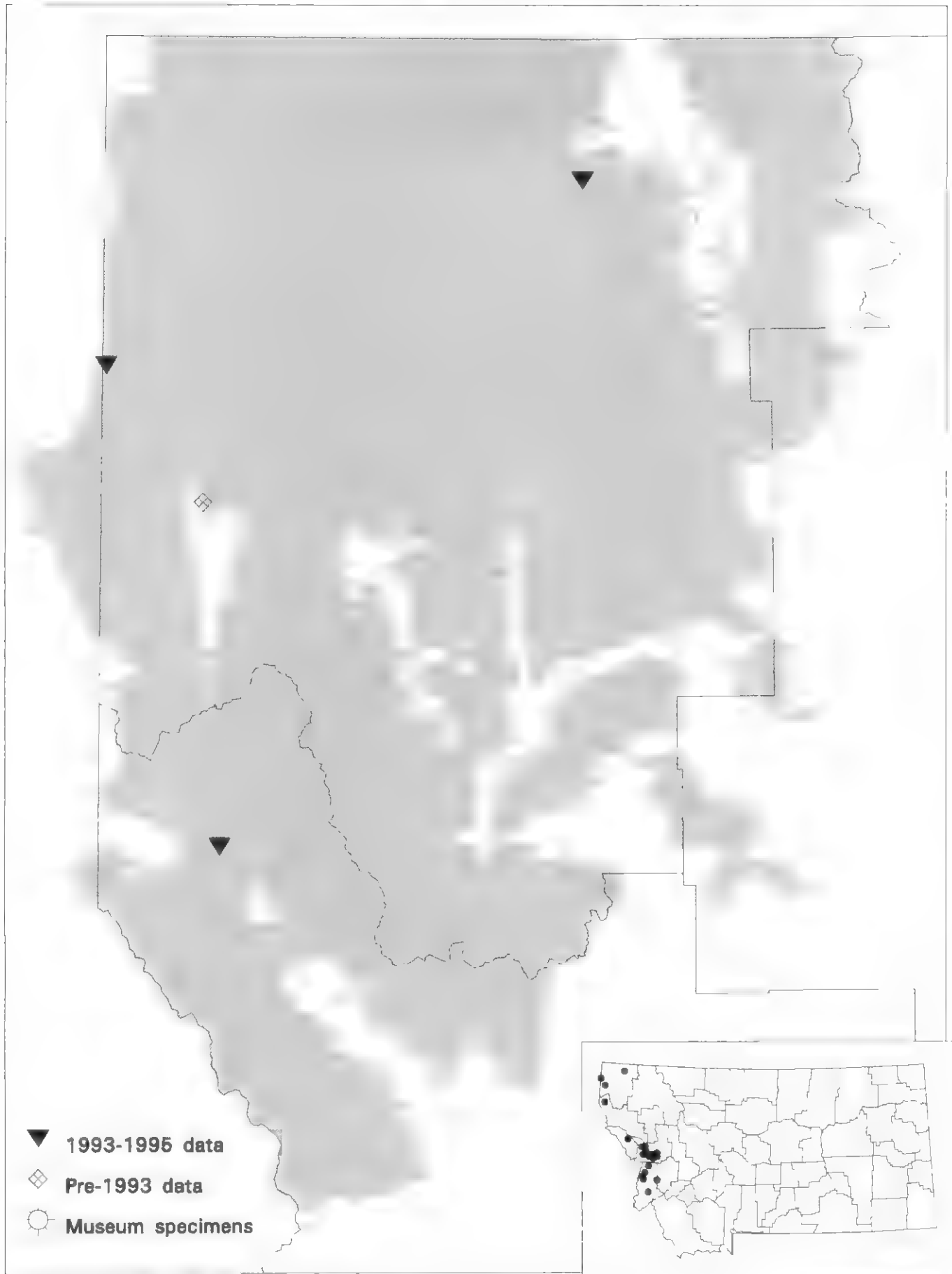
Rana pipiens -- Northern Leopard Frog
Occurrences on or near the Kootenai National Forest, Montana



Species locations from the Montana Natural Heritage Program, February 01, 1996

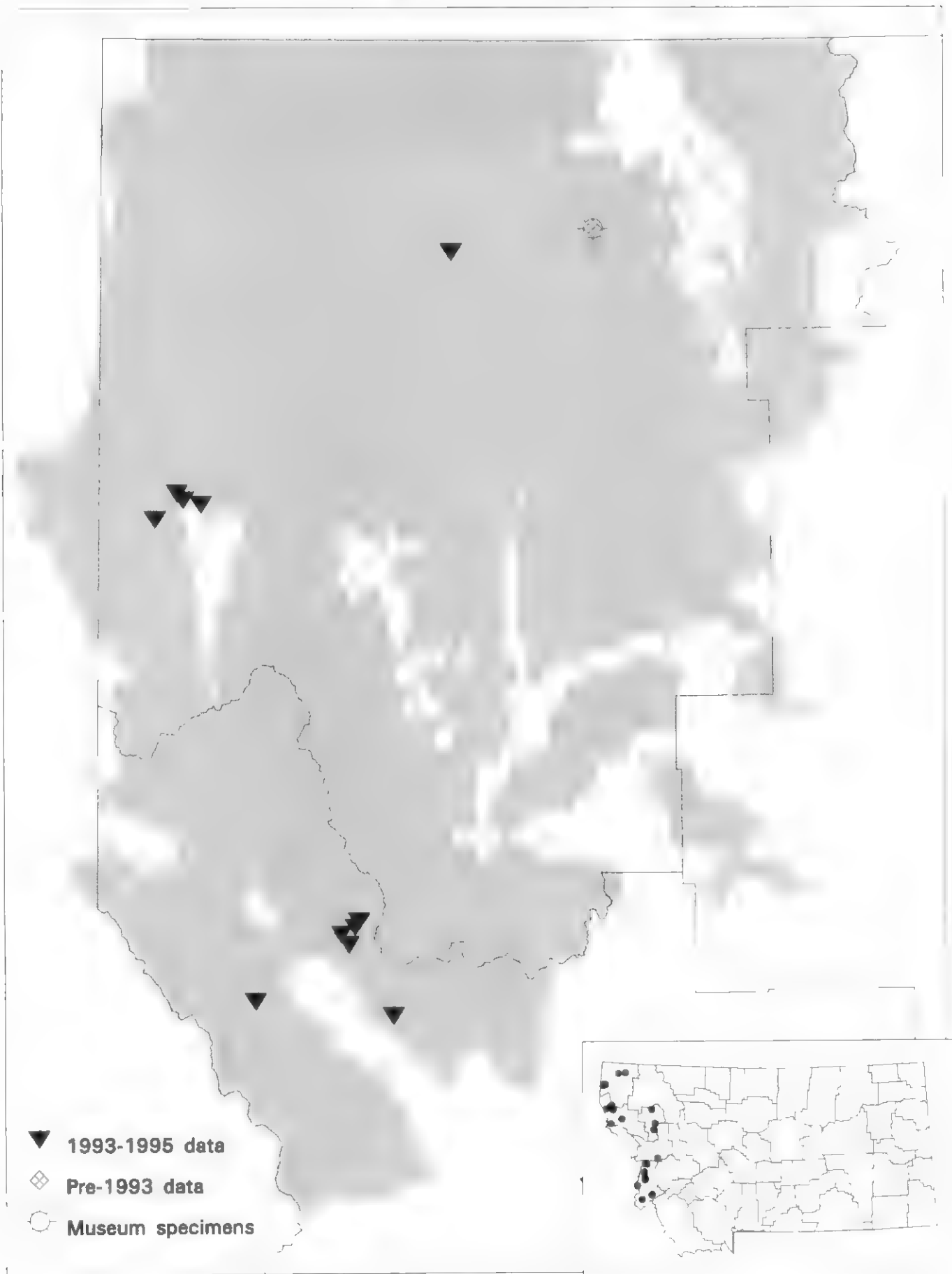
Eumeces skiltonianus -- Western Skink

Occurrences on or near the Kootenai National Forest, Montana



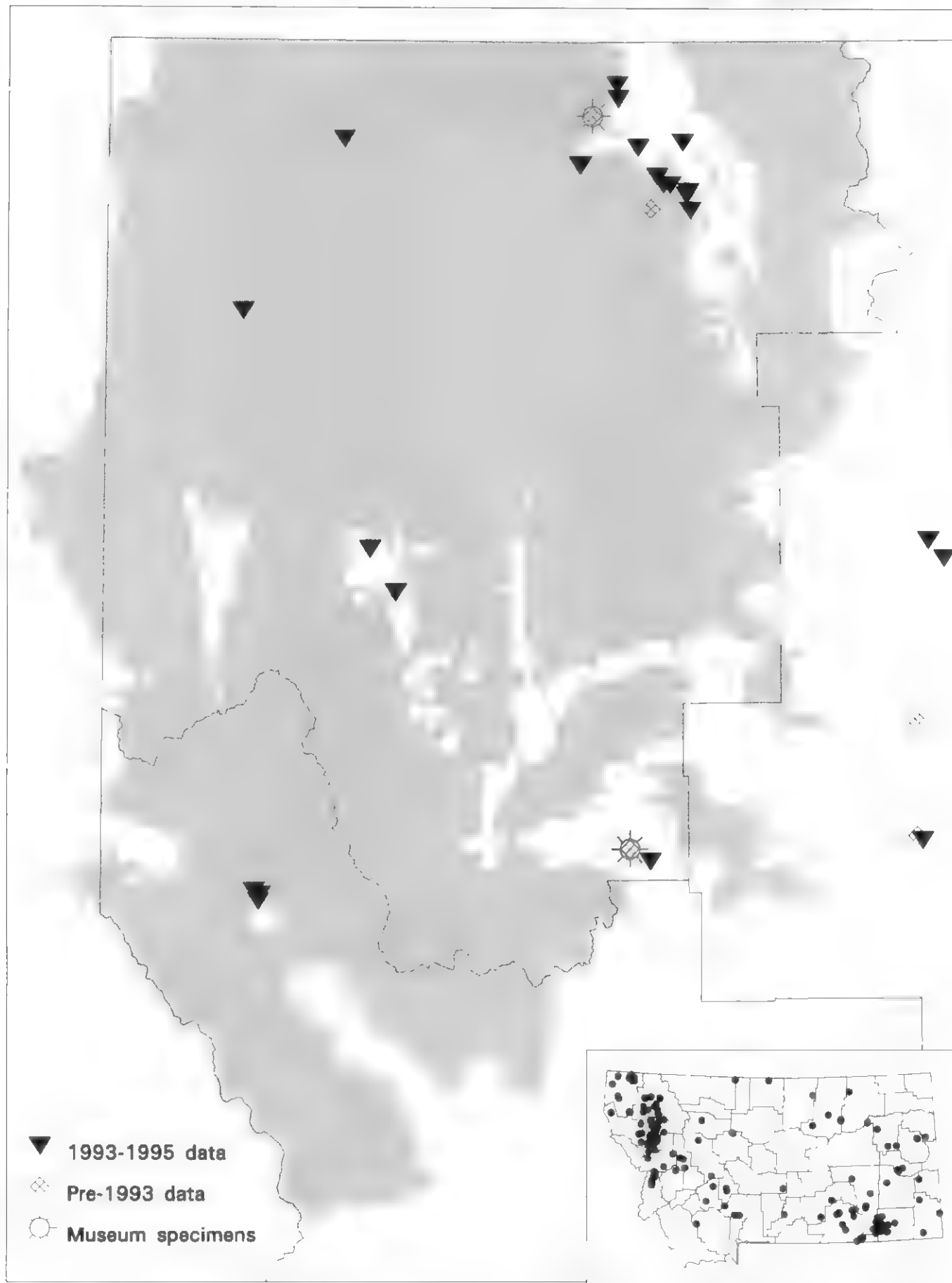
Species locations from the Montana Natural Heritage Program, February 01, 1996

Elgaria coerulea -- Northern Alligator Lizard
Occurrences on or near the Kootenai National Forest, Montana



Species locations from the Montana Natural Heritage Program, February 01, 1996

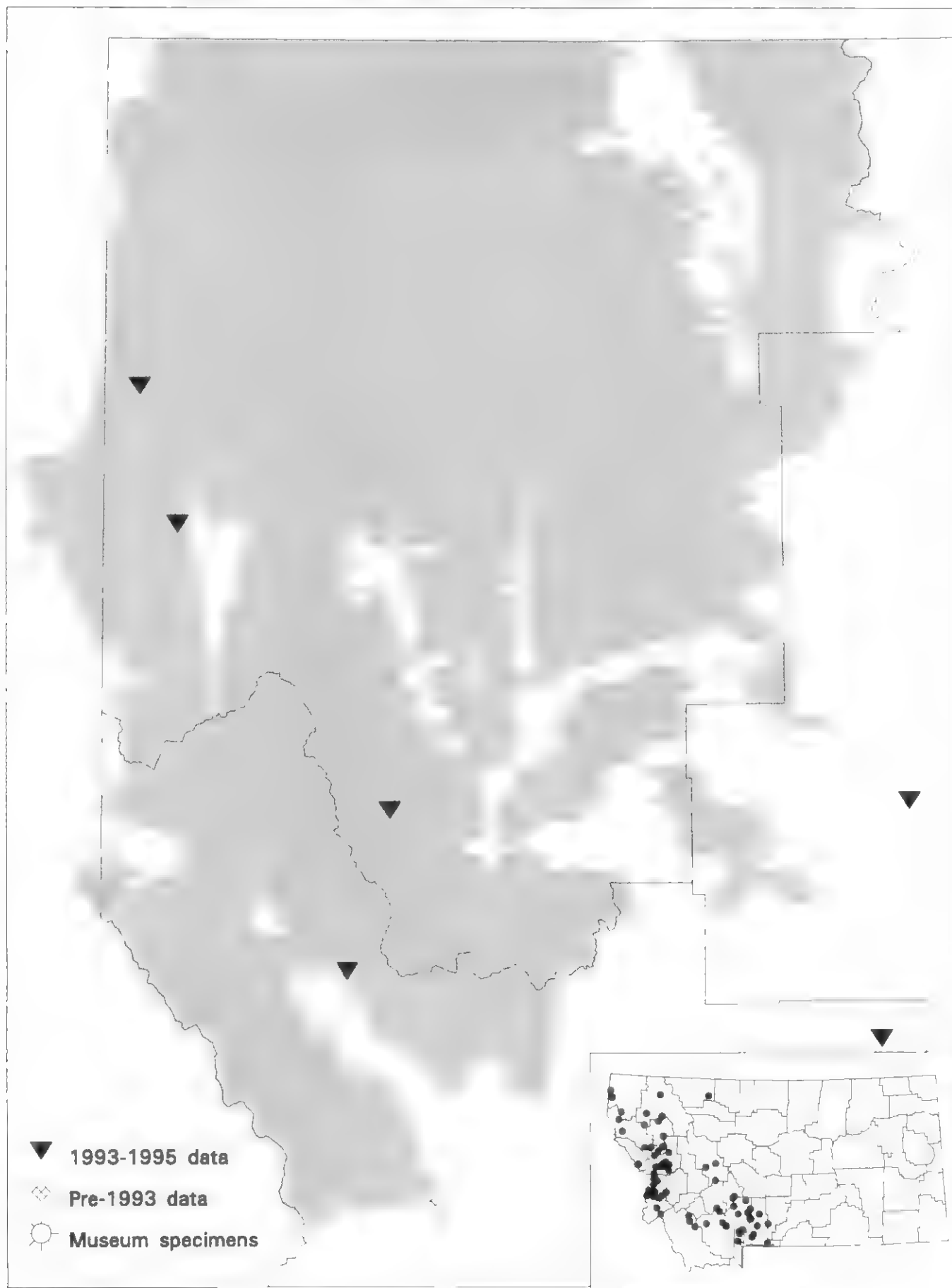
Chrysemys picta -- Painted Turtle
Occurrences on or near the Kootenai National Forest, Montana



Species locations from the Montana Natural Heritage Program, February 01, 1996

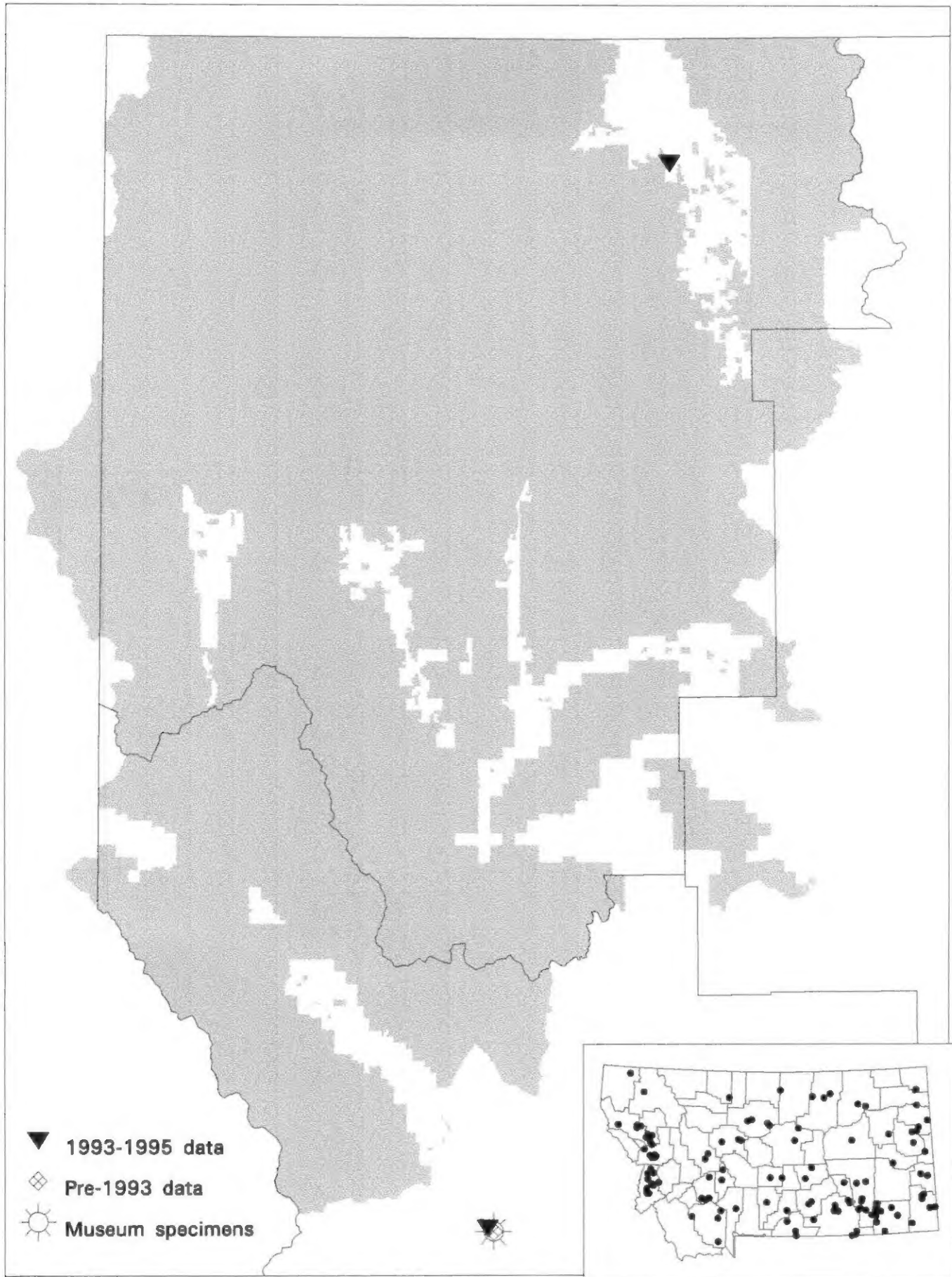
Charina bottae -- Rubber Boa

Occurrences on or near the Kootenai National Forest, Montana



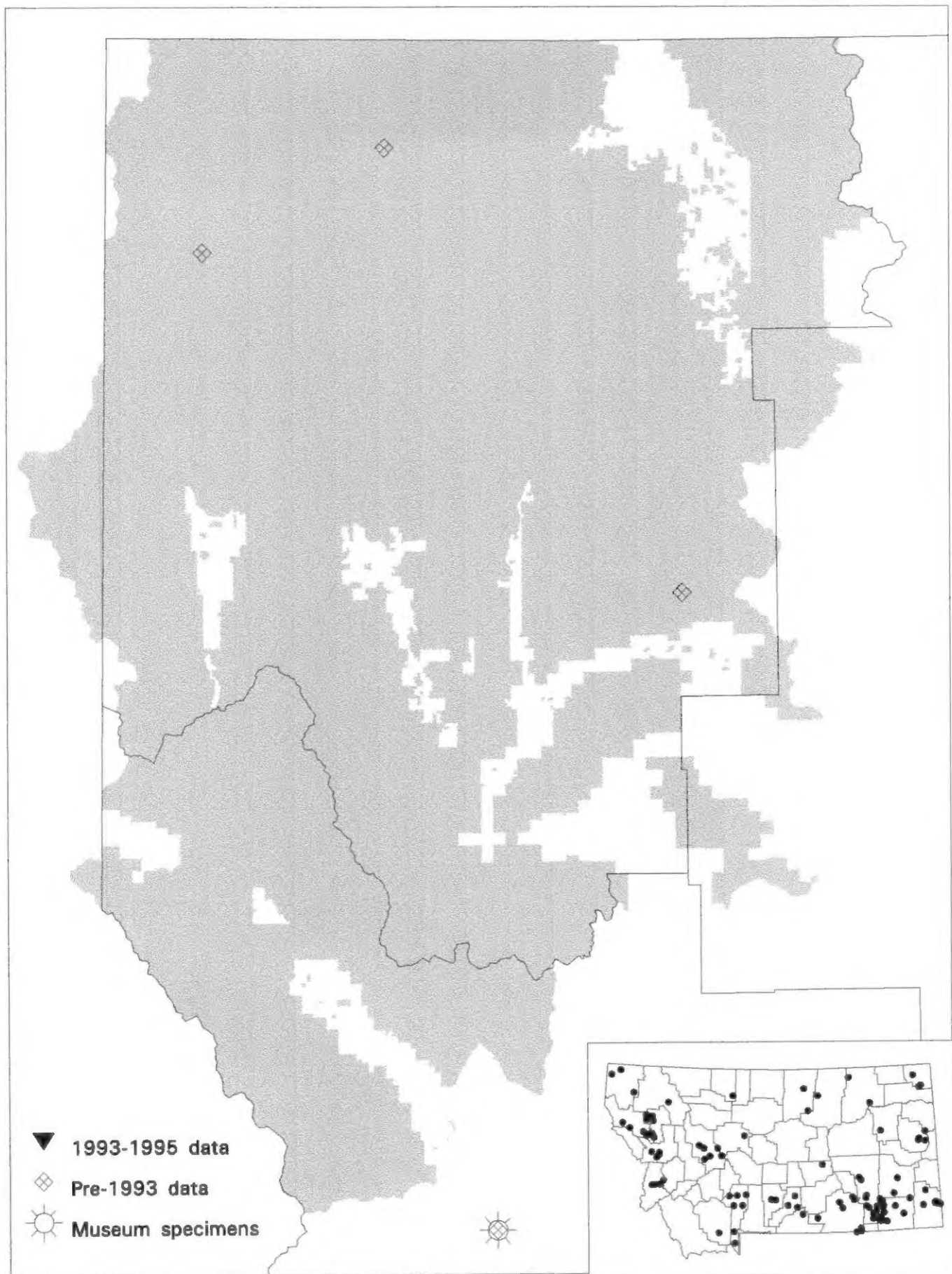
Species locations from the Montana Natural Heritage Program, February 01, 1996

Pituophis catenifer -- Gopher Snake
Occurrences on or near the Kootenai National Forest, Montana



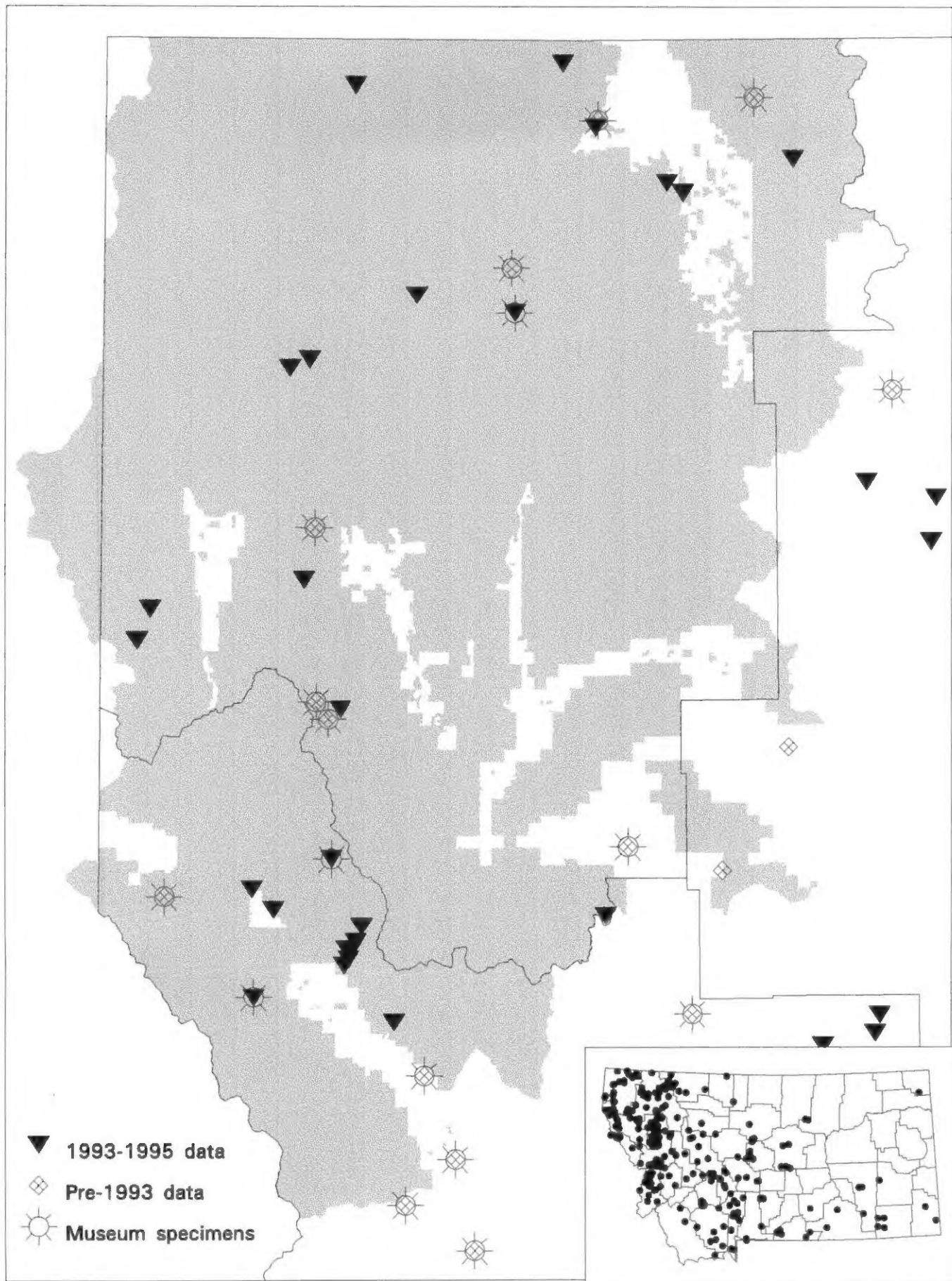
Species locations from the Montana Natural Heritage Program, February 01, 1996

Coluber constrictor -- Racer
Occurrences on or near the Kootenai National Forest, Montana



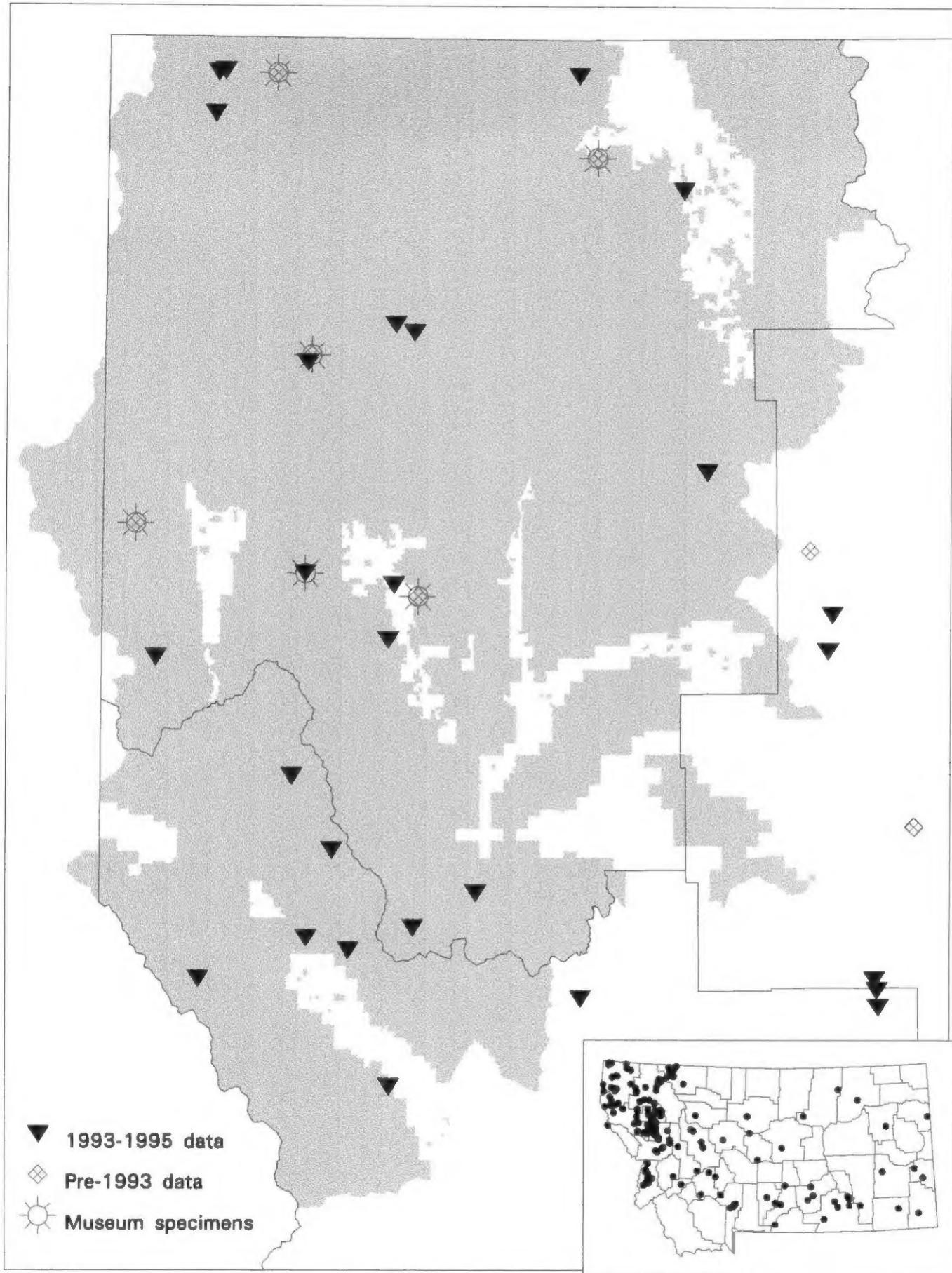
Species locations from the Montana Natural Heritage Program, February 01, 1996

Thamnophis elegans -- Western Terrestrial Garter Snake
Occurrences on or near the Kootenai National Forest, Montana



Species locations from the Montana Natural Heritage Program, February 01, 1996

Thamnophis sirtalis -- Common Garter Snake
Occurrences on or near the Kootenai National Forest, Montana



Species locations from the Montana Natural Heritage Program, February 01, 1996